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Some Observations on Immunology in General Practice.*

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Immunology, or rather, what we understand of the subject, is so vast and so complex that in a single paper one can only attempt to discuss the fringe of this important branch of therapeutical science.

For descriptive purposes it may be divided into two classes—the purely academical, and the practical—although in reality the comprehension of the latter can only be realised by a sound grasp of the former, while the application of the latter without a knowledge of the former tends to give the practitioner an empirical outlook.

With the advance of science, therapeutical empiricism is rapidly drawing to a close owing to a better understanding of physiology, pathology, biology, and pharmacology. With regard to the latter, however, it is notorious to think of the number of therapeutical preparations since the days of Vedas which have been foisted on the human and animal races, and which in due course have been discarded; and it is equally notorious that in spite of them all such a number of lives survived. For this there must be a reason. A wonderful preparation is discovered, and with it the dawn of a new therapeutical era. This drug holds sway until the novelty wears off, or until another comes to take its place. In the meantime, for æons of ages, Nature has been silently but surely working out her own cures in her own way, without any flourish of trumpets, or the blast of a single horn. The surgeon amputates a limb, removes a neoplasm; but who heals the stump or closes the gaping wound? Nature is the Master Physician, the possessor of all the attributes of the healing art; and the better we understand her and her ways, the more successful shall we become in our continual fight against disease.

Now, of all the branches of therapeutics, I look upon the elements embodied in immunology as the most valuable, for they are in complete alignment with Nature's own methods of preventing or curing disease; and that we may possess a better understanding of these, let us glance briefly at the processes which take place in bacterial infection, and see how Nature circumvents them. To grasp the subject under discussion, we must never lose sight of the fact that in all specific diseases there exists an inter-action between the disease producing agents on the one hand and the animal body on the other, for it is here that the cardinal basis of immunology is to be found. Pasteur's great work was based upon this conception, and he found that by injecting an infective agent into a susceptible animal, an acquired immunity, absolute or relative, permanent or temporary, took place; and further, the phenomena produced were merely a phase of natural infection. It must therefore follow that infection and immunisation are intimately bound one to the other; and, arising out of this, two pertinent questions confront the immunologist: (I) How does infection occur and produce disease? (II.) How does the animal body overcome disease?

(I) How does Infection occur and produce Disease?

It may be accepted as a *sine qua non* that a perfectly healthy and intact epidermal integument offers a more or less complete barrier to bacterial aggression. In like manner, the epithelial lining carries with it a large degree of resistance. The nasal mucosæ normally harbour several types of bacteria leading a saprophitic existence, the protective mechanism being sufficient to prevent them becoming parasitic. Should this balance of power, however, break down, the bacteria may become suddenly aggressive and disease be set up.

Fortunately, the pathogenic action of bacteria has limitations, and they are not all endowed with the same aggressive action. Hence we have the virulent type at one end, and at the other the avirulent. Again, by reason of the selective action of some bacteria, their scope is limited. For example, Johnë's bacillus can only make its presence felt in the intestines, and the virulence of the anthrax bacillus is at its height in the blood-stream.

Again, certain bacteria are exacting as to their host; thus, for example, the horse is immune to quarter evil. Then again, some bacteria will not flourish unless in the presence of others. A good example of this is seen in the case of the tetanus bacillus, which only becomes pathogenic grossly in a wound in the presence of pus-producing organisms, owing to its being an anærobe. While Nature has protected the animal body against the ravages of bacteria, she has also bestowed upon some bacteria a protective envelope in the shape of a capsule. This capsule formation is well developed in the case of the anthrax bacillus, the streptococcus equi, and the streptococcus of mastitis, while in other organisms a thickening of the ectoplasm has been noted in such

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as the colon bacilli and staphylococci. This protective capsule is a valuable asset in bacterial aggression, and further, it is capable of development as it passes from animal to animal; in other words, the bacteria become, so to speak, "animalised," and this is one reason why epidemics gain in virulence. *Per contra*, when as the result of passage through the animal body the capsule becomes lost or attenuated, the infection dies down.

In addition to this sheath of armour, bacteria possess aggressive weapons of warfare in the form of exotoxins, endotoxins, and bacterial proteins. The former are actively secreted during life; the two latter, after disintegration. These poisons are in the main responsible for the clinical manifestations we note during the course of a specific disease. These are briefly:—

(i) *The Period of Incubation*, which begins at the moment of infection, and ends at the first manifest symptom. This period may be very short, in which case the body cells are overwhelmed by the virulence of the infection, such as occurs in anthrax; or it may be slow and insidious, as in rabies or tuberculosis.

(ii) *The Period of Prodromal Symptoms*, where the constitutional disturbance is comparatively mild, due to the diffusion of the bacteria and their products into the circulation, and their depressing effect upon the tissue cells in general. It is believed that at this stage a proteolytic ferment is being generated by the body cells to attack the bacterial protein, and thereby liberating toxic elements and setting up symptoms of intoxication.

(iii.) *The Period of Festigium*, or high fever, when the disease is at its height, and when the struggle of the offensive and defensive forces is most marked. The temperature is at its height, the pulse and respiration is rapid, and the depression is great. During the time the fight wages there are remissions and exacerbations depending upon which is winning, and the general stability of the body cells to make good the wastages due to the wear and tear process. During this period the protective ferments are most active in breaking up the bacterial protein, but unfortunately for the animal this means the liberation of more toxin, which may be so great as to overwhelm the host, and this fact probably explains the reason why the most vigorous and full-blooded animals often succumb to acute bacterial infections so rapidly, as, for instance, in quarter evil.

(II.) How does the Animal Body overcome Disease?

The foregoing is a brief review of the aggressive forces enjoyed by bacteria in the production of specific infections. Now let us equally briefly note the defensive mechanism employed by Nature against infection.

These forces are divided into two main groups, the cellular and the humeral. In the former the phagocytes take precedence; and Metchnikoff, who did so much to demonstrate their actions, divided them into two groups, microphages and macrophages. The former represent the group containing the polynuclear and polymorphonuclear leucocytes. The latter comprise a more heterogenous group, and include the large mononuclear leucocytes, the endothelial cells, the mononuclear cells of the lymphatic glands and of the spleen, the bone corpuscles, the giant cells of bone marrow, and the large epithelial cells of the respiratory mucosæ. The group, as you will see, is a formidable and widely distributed one, so that one must presume that wherever the portal of infection is, phagocytosis invariably takes place at the outset. When a micro-organism is attacked by a phagocyte, granular degeneration and ultimate digestion takes place, enhancing its fighting power and increasing its immunity against further bacterial aggression. On the other hand, the aggressivity of the organism may be such that the cell is destroyed.

The phagocytes, capable as they are in themselves of attacking and destroying bacteria, are greatly assisted in their action by the presence of blood serum.

Wright and Douglas demonstrated the presence of a substance in the serum which they called opsonins, derived from the Latin verb *opsonare*, "to cater to." One can therefore readily understand the logic of applying heat to a local infection, thereby producing hyperæmia, and consequently increasing the phagocytic content and the flow of serum. Phagocytes by reason of the infection are attracted to the focus of bacterial invasion by chemotactic influences, and this is known as positive chemotaxis. The opposite phase, however, may predominate; *i.e.*, negative chemotaxis, when there is a liability of the generalised infection and the bacteria running riot, as for example, in bovine anthrax.

Now, any factor which tends to lower the vital activity of the phagocytes or the bacteriotropic content of the blood, thwarts the immunising mechanism. For example, we all know the fatal issues which take place in pneumonia after influenza in the horse, or distemper in the dog. As the result of bacterial invasion, as we have seen, Nature not only sets up an offensive warfare through the phagocytes, but she begins to fortify her citadel by the elaboration of immune bodies. The most important of these are:—

Antitoxins are anti-bodies produced and found in the serum of an animal following upon the inoculation of bacterial toxins. They neutralise their respective toxins, and are specific. Ante-tetanic serum is an example.

Agglutins are anti-bodies capable of grouping bacteria into clumps, and, if they are mobile, checking their mobility; although their action does not appear to be very definite, they certainly assist in bacterial destruction.

Opsonins, as we have seen, prepare the bacteria for the phagocytic feast.

Bacteriolysins are immune bodies found in the body fluids which destroy bacteria with or without lysis. They function largely in infections of the B. coli type.

Cytolysins are specific anti-bodies which possess the power of destroying bacteria.

Finally, other normal defences of a lesser degree must be noted. In addition to the intact epidermal and epithelial linings already mentioned, there are the surface secretions.

Surface discharges tend to prevent bacterial invasion by mechanically washing away bacteria; by germicidal activity of the acids they contain; and by the bactericidal elements in the shape of anti-bodies present.

The hydrochloric acid of the gastric juice keeps the stomach in an almost sterile state, whilst the milk, the urine, and the bile all possess antiseptic properties.

Types of Immunity.

This brings me to the question of immunity, of which there are two forms—natural and acquired.

Natural Immunity. Natural immunity is the power to resist infection, and is a normal possession of a more or less constant nature. Of these there are several types. Thus we find species immunity; distemper is peculiar to carnivora, foot-and-mouth to ruminants, swine fever to pigs, glanders to the horse. Age also seems to play an important part in the immune role, for we seldom find distemper in an old dog, or strangles in an aged horse.

Acquired Immunity. Of this we have two types—active and passive. Active acquired immunity may be brought about by contact with the essential factors of infection in the course of disease, or by vaccination.

Passive acquired immunity is obtained by injecting into an animal serum which is rich in immune bodies; for example, anti-tetanic serum. This method of immunisation, as the word passive implies, inflicts, so to speak, no strain on the protective mechanism of the animal; hence its application may be effected with safety in acute affections or terminal phases of disease, where the body forces are in an exhausted condition. Unfortunately, serum or passive immunisation is only short of duration, for as soon as the serum is eliminated from the body, immunity has gone. This varies from ten days to three weeks, according to the disease. Passive immunisation is, however, valuable as a prophylactic in such outbreaks as anthrax and quarter evil, after which the animals should be vaccinated. As a curative agent, passive immunisation is also useful in influenza, distemper, and in the very early stages of anthrax in the horse, quarter evil and hæmorrhagic septicæmia in the ox, and streptococcal and stahpylococcal infections generally.

Active immunity.—When an animal becomes infected either naturally or artificially, the macro-organisms, as we have seen, elaborate anti-bodies against the infecting agent, and a varying degree of protection is established. This is known as active immunisation. Those substances capable of stimulating anti-body formation are called antigens, and where the antigen is in the form of a vaccine the process is known as vaccination, the term being first applied by the immortal Jenner when he induced immunity against smallpox by inoculating a small dose of the antigen previously attenuated by passage through the cow. The virus, he found, although incapable of producing the disease, stimulated anti-body formation and consequent immunity. Jenner was unable to explain how this modification was brought about, and it was left to Pasteur many years later to discover the fact that light, high and low temperatures could so reduce the virulence of a micro-organism that if it were injected into an animal, immunity, but not the disease, could be induced; and further, the passage of an organism through the system of an animal with a given resistance, that organism became so attenuated as to become non-virulent eventually.

These discoveries laid the foundation of prophylactic immunisation, for this led to Pasteur attenuating the bacillus of anthrax by exposure to certain temperatures for various durations of time, the drying of the virus of hydrophobia, and the production of his vaccines against symptomatic anthrax, rinderpest, and swine erysipelas. The foundation so truly laid by Pasteur has enabled his followers and successors to build a superstructure which stands to-day as one of the wonders of medical science.

Vaccines and their Application.

Vaccines are divided into two classes—stock and autogenous.

Stock vaccines are generally polyvalent; that is to say, the bacteria embodied in the emulsion are composed of several strains. They are not to be compared with autogenous vaccines in therapeutical value.

Autogenous vaccines are derived from the bacteria actively participating in the fight of a given host; consequently they are the exact scientific embodiment of what a vaccine should be. Then again, we have vaccines according to their method of production; for example, sterile, attenuated, virulent vaccines. Then we have de-sensitised vaccines, de-fatted vaccines, and de-toxicated vaccines. It is impossible in this paper to enter into the technique of these various vaccines; but I should like to make an observation in regard to the collection of "materies" preparatory to making an autogenous vaccine, as it is of vital importance to the general practitioner who has charge of the case, to the vaccine therapeutist who prepares the vaccine, and last, but not least, the patient. The most rigid sterile precautions are essential, for it must be obvious to anyone that if there is embodied in the material accidental alien bacteria, these will find their way into the vaccine, and probably spell disaster all along the line. The following precautions should therefore be observed:—

(I.) Abscess. *Closed.*—Paint the surface with tincture of iodine, lance with a sterile knife, and insert the sterile swab, rubbing it gently against the abscess wall. *Open.*—Paint the orifice with tincture of iodine, squeeze out superfluous pus, and insert the sterile swab, rubbing it against the abscess wall.

(II.) Bladder. Sterilise the catheter and withdraw the urine. When the flow is drawing to a close, collect in a sterile tube.

(III.) Blood. Blood may be collected by opening a superficial vein, preferably situated in the external ear, the hair having been previously clipped,

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and the skin painted with pure lysol, several drops of blood being allowed to escape before collecting in a sterile vessel. Or, the needle of a sterile hypodermic syringe is plunged into the jugular vein, the blood aspirated and injected into a sterile tube, and labelled.

(IV.) Cavities. *Chest.*—In drawing fluid from the chest the hair is clipped over an intercostal space near the sternum, and the skin painted with tincture of iodine. A small sterile trocar and canula is thrust through the chest wall close to the anterior edge of the rib, and the fluid collected in a sterile tube.

Nasal.—In taking a nasal swab, the inferior nares is first painted with tincture of iodine. An ordinary swab held by a long pair of forceps is then passed into the superior nares, rotated, and withdrawn.

Note.—It is not advisable to take a swab from the inferior nares, so many alien bacteria being invariably present there.

(V.) Joint. Clip hair, paint skin with tincture of iodine, and aspirate fluid with a sterile syringe.

(VI.) Lung Puncture. To secure active bacteria from the lungs, a special syringe with a close-fitting metal plunger and a long bayonet-pointed needle is necessary. The skin is sterilised, and the syringe charged with two to four c.c. of sterile nutrient broth, the needle is thrust between the ribs into the lung structure two or three inches, the broth injected and re-aspirated into the syringe, the resultant fluid collected in a sterile tube, and labelled.

(VII.) Mammary Gland. Remove a quantum of fluid from the teat by milking. Paint the nipple with tincture of iodine. Knead the organ, and milk the fluid into a sterile tube, and label.

(VIII.) Sinus. Cleanse all pus from the orifice. Paint opening with tincture of iodine, insert the sterile swab as far as possible, and withdraw.

(IX.) Uterus. Wash the lips of the vulva with an antiseptic, dry, paint with tincture of iodine. Wash the right hand in petrol and allow it to dry, lubricate, and clasp a sterile tube one to two inches long, covering the mouth with the thumb. Insert, and after reaching as far into the womb as possible, remove thumb and draw the open mouth of the tube along the mucosa. Withdraw, plug with a sterile cork, and label.

Phases following Vaccination.

There are three phases presumably following vaccination; *i.e.*, the negative, positive, and increased resistance phase. (See diagram.)

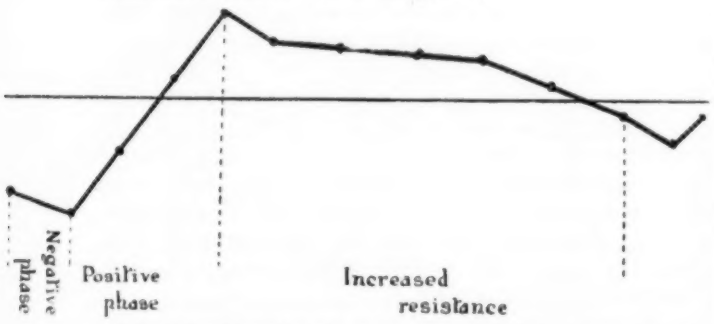


Chart showing the effect of a suitable dose of Vaccine. From Scott's "Clinical Bacteriology and Vaccine Therapy."

The *Negative Phase* indicates, it is believed, a lowering of the opsonic index, which may last from 12 to 24 hours. The curve from this point is upwards, constituting the *Positive Phase*, which may cover a period of two to three days, when a steadying of the balance follows, this being the *Increased Resistance Phase*, which usually lasts another two or three days. The interpretations of these data in practice are obtained by careful clinical observation, but of course they must always be largely relative.

For example, the reaction may be so slight that neither rise of temperature, increase of heart's action, or aggravation of the lesions are noticeable. Nor is this desirable in acute conditions. In fact, the immunologist must be very circumspect in the question of dosage, so that the negative phase may be negligible. When one is dealing with a chronic disease, however, the doses must be large, or else no benefit will follow.

Dosage. It is well, however, that the practitioner should know that these phases do exist, and he should exert his utmost to interpret them, for in the regulation of dosage they are most important. It may be taken as a definite axiom that in acute diseases small doses of vaccine are indicated, while in chronic conditions large doses are required. For this the reason is obvious. In acute affections the protective mechanism is very low, and the injection of a vaccine lowers it still further during the negative phase, thereby tending to embarrass Nature's resources. What the vaccine therapist must aim at, therefore, is a slight negative phase, which can be attained by injecting a small dose. But as the effects of small doses pass off more rapidly, they should be administered more frequently, generally speaking every 30 to 40 hours. The size of the dose and the spacing of time between each injection must ever be left to the clinician, who in turn cannot act by rule of thumb methods, but must treat each case upon its merits. On the other hand, in chronic affections large doses are called for, and injected at longer intervals.

The diagrams on the following page give a general idea as to the dose, and the periods between each injection.

Scope of Vaccine Therapy.

In recent years vaccine therapy has progressed to such an extent that its principles are now applied to a wide range of diseases. In fact, it may be said where micro-organisms are the root cause of disease active immunisation may be carried out. The following list indicates how extensive the range is:—

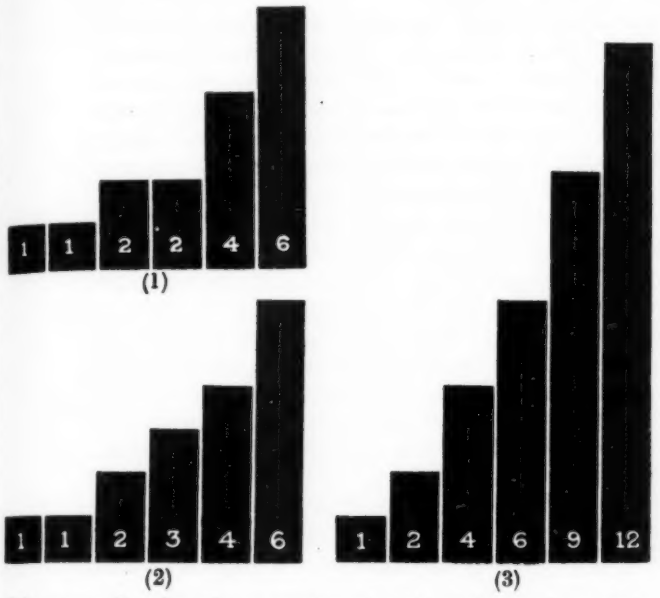
Cutaneous System.—Abscesses, fistulas (poll, withers croup, anus, rectum), grease, cysts (interdigital), acne (interdigital), follicular mange, eczema, wounds, ulcers, dermatitis, erysipelas.

Alimentary System.—Diarrhœa, dysentery, fowl cholera, gastro-enteritis.

Respiratory System.—Catarrh, bronchitis, pneumonia, pleurisy, empyæmia, roup (avian).

Urino-Genital System.—Pyelo-nephritis, cystitis, metritis, endo-metritis, leucorrhœa, vaginitis.

Lactiferous System.—Mastitis.



Diagrams showing the proportional ratio of doses of vaccines to be used in (1) acute (2) subacute (3) chronc diseases.

From Scott's "Indexed System of Treatment."

Specific Infections.—Canine distemper, influenza, strangles, anthrax, quarter evil, pyæmia, septicæmia, joint evil, tuberculosis, actinomycosis, Johnë's disease, abortion, white scour, hæmorrhagic septicæmia.

With the time at my disposal, it is impossible to go through this list in detail. I propose therefore taking a few of the most important affections, and briefly touch upon the most salient points. At the same time I shall embody a few remarks as to the collateral general treatment. Vaccine therapy is not the *Alpha* and *Omega* of all treatment, nor can it ever be so. To be successful it must go hand-in-hand with other modes of rational treatment. To give only one example, a vaccine will never clear up an infected wound if a foreign body is lodged there, or a bone sequestrum.

Fistula.—In whatever situation of the animal body a fistula is found the principle of treatment is the same, and the step of first importance consists of securing good drainage, for no vaccine can ever alter the law of gravity. Pus, moreover, contains a ferment called trypsin, which has the power of digesting tissue cells; hence we talk of pus burrowing. It is interesting to note on this point there would be no limit to this burrowing capacity if Nature had not in her wisdom supplied the blood with an anti-tryptic content which increases in the presence of pus. It is conceivable to conclude, therefore, where excessive burrowing takes place this content is low.

The next point is to note the nature of the pus. If it is thin, watery, and of a greyish colour, it may be gathered the phagocytes are putting up a poor fight. This may be due to systemic debility, in which case good food and tonics are indicated, or it may be that, owing to the fact that the wall of the sinus has become so indurated, the leucocytes and immune serum cannot filter through to the bacterial foci. In this case curetting is called for. The old-time practitioners inserted a plug of perchloride of mercury, which sloughed out the wall and dead tissue, leaving a healthy granulating surface. In a few cases, especially in full-blooded animals, the calcium content of the blood is so high that filtration into the sinus is difficult, in which case a decalcifying agent is called for, such as saturating the system with full doses of sodium citrate. On the other hand, where the pus is thick and creamy it is a hopeful sign, and shows that Nature is putting up a good fight.

When an animal falls a victim to poll evil or fistula of the withers, one thing stands out as an irrefutable fact, and that is the protective mechanism has broken down, and the anti-body formation has failed to overcome the infection. This being so, the surgeon who completely removes all dead and diseased tissue only partly completes his work if he fails to raise the immunising index. Herein, in my opinion, is the reason why one gets recurrences after surgical operations alone.

The ideal then for fistula is to be found in combining surgical methods with active immunisation. In fistulous conditions the organisms most commonly found belong to the pus-producing type; *i.e.*, streptococci and staphylococci, with occasionally diphtheroids and *B. coli*. In my experience sterile vaccines in these cases are of small value. I never use anything but attenuated cultures here in making the vaccine, and in some cases virulent ones, for I have found from considerable experience the less one subjects antigena to heat or chemicals, the more pronounced is the immunising reaction. In addition, the doses should be large, and carried out for a considerable period.

Pneumonia.—Here is one dealing with an exactly opposite type. Fistula is a chronic condition where the balance of Nature is but little disturbed, and where the protective elements which in themselves may not be capable of bringing about resolution, are nevertheless able to confine the lesions to local and non-vital structures. Pneumonia, on the other hand, is an acute disease, involving vital organs wherein the bacteria and their products are liable to run riot, establish a vicious circle, and often end in the destruction of the host. Where one is dealing with a primary pneumonia, the chances of recovery are much greater than where the disease manifests itself as the terminal phase of such depressing infections as distemper and influenza. In treating pneumonia it appears to me there are three danger avenues which we must assist Nature to guard.

First, oxygen starvation, where the lungs become gorged with blood and inflammatory effusions, so that free air cannot reach the vesicles. For this, an abundance of fresh air is indicated.

Second, cardiac failure, owing to the great strain placed upon that organ in forcing the blood through a gorged pulmonary system, the condition being aggravated by the depressing influence of free toxins. Here the subcutaneous injection of such agents as strychnine, digitaline, caffeine, and camphor are indicated. In addition, in the early stages phlebo-

tomy and counter irritants to the chest wall are advised. I realise that by advocating these measures I am going contra to present day views; nevertheless, I am satisfied as to their therapeutic value. I know of no drug which will steady what might be called a "sledge-hammer" heart bursting with blood quicker or better than blood-letting, provided the operation is done early and the bleeding is copious.

Third, bacterial toxæmia, augmented by metabolic intoxication, due largely to the paralysing effect of the former. Here we are at the root of the infection, and we must tackle it with energy. If the case is seen early, counter irritants are advised. By so doing a subcutaneous hyperæmia is set up which tends to relieve the pulmonary condition, but it does something more. It accelerates the cellular elements, remote from the seat of infection, and thereby stimulates phagocytosis. In like manner, the production of a fixation abscess by the subcutaneous injection of turpentine is advised. To remove free toxins and metabolic effete material, the eliminative systems should be kept well flushed by an abundance of drinking water and barley water, and by placing salt on the tongue the animal will drink more. The body should be well clothed to stimulate the sweat glands, the bowels unloaded by laxatives, and the kidneys stimulated by diuretics.

Lastly, I know of no better eliminative than the subcutaneous injection of normal saline solution in large volume. It is a true washer of the blood. In addition, in these cases the blood reaches a high coagulation point, particularly in the lungs. This can be warded against by full doses of sodium citrate. The inhalation of medicated vapours, save for soothing the mucosæ of the upper air passages, appears to me to be futile. They certainly cannot exercise any inhibitory action upon bacterial growth, nor indeed can any agent of the chemo-therapeutical class.

Bacterial destruction can only be brought about by the body cells and body fluids themselves. To activate these, vaccine therapy is called for. A word of warning, however, is required. It must be remembered in pneumonia a fight to the death is the order, and the battlefield is a vital organ, while the whole system sooner or later becomes involved in the struggle. It is irrational therefore to inject here a full dose of vaccine, which would only tend to paralyse the immunising mechanism still more. To overcome the negative phase in these cases I give a full dose of serum at the outset, followed 12 hours later by another injection of serum and a minimum dose of vaccine. This double injection is repeated daily for the next three or four days, depending upon manifestations, the vaccine being slightly increased at each dose if necessary. After this, if the case is holding its own, I give vaccine alone every second day until recovery sets in.

There are two methods whereby materies preparatory to making the vaccine are secured, from the superior nares or by lung puncture. The latter method is preferable. For this, a special syringe is required, and it has been already described. When one is dealing with the contagious form, prophylactic measures are called for also. This consists of immunising the healthy animals with full doses of vaccine, three doses being usually sufficient. The organisms present in these cases usually are the pneumococcus, streptococcus, staphylococcus aureus, and albus, and occasionally *B. coli pasteurella*.

Influenza.—At first sight the term influenza appears to be a very loose one, for it covers such a variety of conditions that they almost appear to be distinct diseases. Thus we have the catarrhal, bilious, and effusive types. In this manner influenza in the horse closely resembles distemper in the dog; and it may not be unreasonable to presume at the outset we have an ultra-microscopic virus with the bacteria of secondary infection accounting for the varied clinical manifestations as we see them in practice. The organism of first importance is a streptococcus, after which comes probably the Pasteurella. The former invades the blood-stream, hence in part the divers clinical data, and from it the best cultures for preparing a vaccine are derived. The doses, as in pneumonia, should be small at the outset, and if the case is a severe one they should be combined with serum. When one is dealing with a severe outbreak isolation of the healthy, and prophylactic vaccination, should be carried out. Three doses as a rule should be given to each animal, and while vaccination is being carried out these animals should be kept as far as possible away from the infective zone.

Strangles.—Strangles is a disease almost entirely confined to young horses, and as a rule it runs a more or less benign course. The condition is confined to the upper air passages, and runs its course usually without complications. The tendency therefore of the layman is to treat the condition lightly, and although this laxity may be indulged in with impunity in the case of heavy bred horses, when one comes to racehorses and hunters a more serious phase occurs. There is probably no condition more liable to produce roaring and whistling than strangles. It behoves us, therefore, as practitioners to leave no stone unturned to eliminate the bacterial poisons as quickly as possible from the system before organic mischief sets in, by the administration of autogenous vaccines. When the disease runs riot and becomes irregular, those animals which recover are often left physical wrecks. In those cases full doses of anti-streptococcal serum should be administered, followed by vaccines in moderate doses. Where one is dealing with a valuable stud, practical experience teaches me that it is sound economy as a prophylactic measure to vaccinate these animals every six or twelve months, beginning with them as foals, and continuing the treatment until they are four or five years old. The vaccine I use in these cases consists of three doses; the first is attenuated, the second is less so, and the third is virulent.

Mastitis.—If this condition occurs in a dairy, great loss often follows by diminution in the milk supply, and in some cases loss of lives where the infection is

a virulent one and runs riot. The disease may be confined to one quarter, or it may affect all four. Should the bacterial content break through into the lymph or blood stream a severe bacteræmia sets in, which usually ends in death. In some cases the affected quarter returns to normal, and the milk flow is restored; but often as not there is so much damage done to the parenchyma that the milk cells are past functioning, and the quarter goes "dry," or it may die and slough. Irrigation with antiseptics, save in the early stages, is futile, and this cannot be wondered at. The milk ducts are so densely packed with flakes of lymph and casein that it is impossible for the irrigant to reach the bacterial foci, nor can I conceive any beneficent result following the internal administration of antiseptics. Where one is dealing with a few sporadic cases, and it is desirous that no risks of a generalised infection will follow, vaccination should be practised. The greatest benefit, however, is obtained by carrying out prophylactic immunisation. An examination of the bacterial flora of the infection should be made, and from these a vaccine prepared. In these cases I make three doses; the first is attenuated, and the second and third virulent. These are injected every seven or eight days, and the ultimate immunity as a rule holds good. The organisms generally present are streptococci, diphtheroids, and occasionally staphylococci and *B. coli*.

Joint Evil.—I think it is a generally accepted axiom that in this disease there is a pre-natal as well as a post-natal infection seen in practice; and further, that active immunisation of the pregnant mare has been successful in reducing to a very large degree the number of cases of joint evil in foals. Such, at any rate, is my experience and that of my co-workers. I prefer to begin vaccinating the expectant mother about the seventh month, giving three doses in all, about seven to nine days apart. The vaccine is attenuated, and comprised of streptococci, staphylococci, and *B. coli*. If the foal is a valuable one I advise in addition 15 c.c. serum, and ten days later 30 c.c. serum. In those cases where true joint evil is established, curative treatment is as a rule of little avail, and should the animal recover it is seldom of much value.

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I selected these foregoing diseases at random, and not with any specific objective in view. I wonder if you have noticed a singularly common element binding them together, diverse clinically as they are. After finishing this paper I was suddenly struck by the fact that an organism of the streptococcal flora was present in every one as a primary or secondary factor. I have long looked upon streptococcal infections, with their congenial bed-fellow, the staphylococci, as the *bête noire* of comparative pathology, and if we could eliminate this group or counteract their ravages we would have fewer deaths in the animal world.

And now, gentlemen, this brings me to the end of what must be a very incomplete paper, for indeed a volume could be written on the subject. Every practitioner in these days must be an immunologist to a greater or lesser degree; and if I have succeeded in stimulating a little enthusiasm into those who belong to the latter class, this paper will have attained its object.

Discussion.

Dr. G. O. Seager Thomas: It is with keen appreciation of the compliment that I accept your invitation to open the discussion on Mr. Scott's most interesting paper. Not only am I very gratified by the privilege of being asked to address you, but also, I am proud of the honour of representing the link between the two sections of the science of medicine.

Mr. Scott's paper has appealed to me in a superlative degree. Naturally, as a pathologist, I am deeply interested in immunology, perhaps more deeply interested than in any other branch of medical work, for there is no doubt that immunology is the true link between the practitioner and the laboratory. But, in particular, I was fascinated by Mr. Scott's treatment of his subject, and, more especially, by his emphasis of the fact that "immunity is Nature's way." This is, in my opinion, the most important truth in all the array of recent medical knowledge. Immunity is Nature's way of carrying out the processes of preventive and remedial medicine, and we shall be wise to remember that Nature is the Master Teacher.

Immunology is the bright particular star in the crown of medical science. Medicine, after wallowing for centuries in a slough of ignorance and superstition, drew itself out of the mire and began its long struggle up the steep and treacherous path of empiricism, and has now reached the fertile highland of rational knowledge, which it is exploring with the guidance of the safe compass of the scientific method. Medicine may well claim to-day to be in the forward line of the sciences, for, while all science probes the secrets of Nature, medical science to a great extent controls them. For instance, physical science has penetrated the innermost parts of the atom and learned how Nature sets free vast stores of energy by radio-activity, but the physicist to-day can no more set free at will or control intra-atomic energy than he can create or destroy matter. Medical science, however, having discovered Nature's method of healing through the study of immunity, now daily initiates, stimulates and controls these processes artificially and at will.

When I was a student, I used to be taught that there were two schools of immunology, the cellular and the humoral. These two factions were for a long time separate and the protagonists of each somewhat antagonistic to those of the other. Now the process of union is almost complete and, as has so often happened in medical knowledge, as indeed in all science, the whole truth is found to consist of the truths of both the opposed schools. I think it is now generally accepted that cellular immunity (leucocytosis, etc.) is of little use without humoral immunity (antibody formation) as well; *i.e.*, that

efficient phagocytosis requires leucocytosis in a plasma rich in opsonins, agglutinins, etc.

The ideal therapy, in my opinion, consists in making use of (1) passive acquired immunity (humoral), *i.e.*, by injection of antisera; (2) active acquired immunity (humoral), *i.e.*, by injection of antigens; (3) active acquired immunity (cellular), *i.e.*, by induction of artificial leucocytosis.

May I take these three items in greater detail? Assume that we have a patient suffering from some infection. The first thing we do is to obtain cultures of the infecting organism with a view to preparing a specific antigen (vaccine). The case may, however, be an urgent one, and we may wish to save time, so, while the vaccine is in preparation, we make use of an appropriate antiserum, thereby neutralising some of the patient's toxins. We may also, *faute de mieux*, give at this juncture a stock vaccine rather than none at all. The use of artificial leucocytosis in conjunction with an antiserum has not been tried to my knowledge, but is about to be investigated shortly. As soon as the specific autogenous vaccine is ready, this is used in treatment, a general guide being that the more acute the case the smaller the dose and the shorter the inter-dose intervals. This will result in producing a plasma rich in the various specific antibodies required, and then artificial leucocytosis is induced by the injection of salicylate of mercury (intra-muscularly) or sodium nucleate (intra-muscularly) or, better still, novarsenobillon (intravenously). The result of this treatment is to induce artificially the identical processes whereby Nature heals infective disorders.

With regard to salicylate of mercury and novarsenobillon, I can say, from experience of controlled experiments carried out by myself at the instigation of Dr. Ferguson, of the United States Health Service, that these drugs do produce an astonishing leucocytosis. Of the two, novarsenobillon is in my experience by far the more constant and the more consistent in its action, and, furthermore, the leucocytosis is longer maintained and is reproduced in a higher degree as a result of repeated injections than in the case of mercury salicylate. Also, the intravenous method has the advantage of being practically painless; this cannot be said of intramuscular injections.

In advocating the use, almost simultaneously, of so many therapeutical agents (antisera, stock vaccines, autogenous vaccines and drugs) I have more than once been accused of descending to what are called "blunderbuss" methods. It is high time this "polypharmacy bogey" was laid once and for all. It must surely be quite clear that there is all the difference in the world between the prescribing of an assortment of medicines in the hope that some one of them may be suitable, and the deliberate administration of several therapeutical agents, each one of which is given for a specific purpose.

I should like here to mention one method of treatment which, in my opinion, combines in a very simple manner all the processes described under what I have referred to as the ideal therapy. I mean "fixation abscess." This is produced by the subcutaneous injection of sterile turpentine. In olden times this method of treatment was in common use, and the interpretation of its action was, that when the abscess pointed and was incised, the pus that came away was the "materies morbi" of the disease draining away from the patient; an idea not so very far advanced from the old notion of conjuring out the evil spirit. Nowadays, we explain the beneficial effects of fixation abscess in a different way; the seton probably acts very similarly. In the first place, by inducing perspiration and diuresis, it eliminates toxins; by shock, it produces rapidly a non-specific immunity; by irritation, it causes a leucocytosis; auto-infection of the abscess turns it into a private, personal, autogenous vaccine factory, thereby causing a lasting specific active acquired immunity. Fixation abscess has, however, the disadvantage of being very painful.

I am not here to waste your time by attempting to enlarge upon the admirable paper written by Mr. Scott. Indeed, I think you would all have been the gainers, and I know that I should, had Mr. Scott extended his paper to cover the time that I am taking up. I read two or three months ago an account of the Scottish Cattle Breeding Conference at Edinburgh in July, and, while the chief interest lay in the fact that stock breeders and veterinary surgeons met on the same platform as pure scientists, yet, to the reporter, the outstanding impression was that each had very much to learn from the other. Well, I find myself here to-day amongst men who are both scientists and clinicians, and I feel that I have more than much to learn from all of you.

In the matter of initiating a discussion on Mr. Scott's paper my difficulty lies in the circumstance that I can find no point where I am not in complete accord with his views, except that I have never so far been brave enough to use a virulent vaccine, unless you consider that fixation abscess and auto-hæminoculation amount to this. There are, however, one or two questions upon which I should be glad of information.

Is auto-hæminoculation (subcutaneous injection of patient's own blood) used at all in veterinary work, and if so with what results?

In human work we sometimes find a streptococcal septicæmia will give positive Widal reactions with bacilli of the typhoid group. Do you come across the same phenomenon? If so, are you able to make any use of the fact?

To what extent are complement fixation tests used in animal work?

With regard to vaccines, I assume that the ultimate decision as to dosage and intervals rests with the clinician, but have you any general guide? Are there any specific idiosyncracies to any particular vaccines on the part of any particular species of animal?

I thank you, again, gentlemen, for the invitation to come here to-day, and for your very courteous attention. I fear I have not brought much with me

in the way of any new information, but I am certain that I shall go back full-handed.

Dr. Thomas, in acknowledging a vote of thanks, said: With regard to vaccines being sometimes disappointing, he thought that if the laboratory workers could get the practitioners to place as much emphasis on the time interval between the doses as they now did upon the size of the doses, they would be taking a very big step forward in the preparation for good results. Concerning nuclein, he was inclined to think, with Mr. Scott, that if the mercurial salicylate turned out as good in general practice as it had done in the purely experimental work, it would wipe out nuclein. He had had experience of it in gonorrhœa in which there had been no resistance on the part of the patient and no discharge.

The PRESIDENT, in inviting further discussion, remarked that personally he did not feel equal to making any comments either on the paper or on Dr. Seager Thomas's reply. They had had a very excellent paper and, in spite of what Dr. Thomas had said, he thought they would all agree they had had a very excellent reply. It was true Dr. Thomas had found but little fault with Mr. Scott's paper, but he had given them plenty of food for thought in his own address and he hoped some of the younger members, in particular, would be able to contribute expressions of opinion which would be advantageous to them all. Possibly Major Hobday would continue the discussion.

Major HOBDAY remarked that he had come there more as a learner himself because, although that subject might be said to be somewhat in its infancy, it had been one that had occupied a good deal of attention for a number of years, both from veterinarians and from those who were engaged in work for the human species. He had been greatly interested in Mr. Scott's paper and, as the President had said, he had given them much food for thought. The use of autogenous vaccines had been a sheet anchor to which they had tried to cling when other things had failed, and he thought their experience had been, as with the human subject, that although these promised very much at one time, it was now pretty well decided that, while vaccines were useful in certain diseases, their use could not be made universal. He was particularly interested in the questions Dr. Seager Thomas had asked. They showed that those of them who were engaged in veterinary practice had exactly the same difficulties that were met with by those who treated the human patient. With regard to the replies to those questions, he thought they had better be left to some specialist, like Mr. Scott, who had practically devoted the whole of his life to this work; but if they were pressed he thought the affirmative would be given to nearly all of them. In reading Mr. Scott's paper, he thought they all owed him a very great debt of gratitude. He must have re-stimulated them to continue with vaccine treatment in certain diseases. Of course the chief value to which they would like to see this put was in preventive medicine. If only vaccines could be found to be an absolutely safe preventive for diseases like strangles, influenza, and mastitis, and if the practitioners could only be persuaded to get their clients to allow them to be used, it would make a tremendous difference to the illness amongst stock in this country. There was a very great deal yet to be done, and one thing which, it seemed to him, they wanted was a little more collaboration; a little closer touch between the laboratory man and the man in the field. He hoped Mr. Scott, in his reply, would go very fully into the questions Dr. Seager Thomas had asked, because they had with them that day the combination which was so much needed—the brains of the man who was working with the human species and the brains of those whose work was in the animal world.

Mr. W. CAUDWELL wished to put one or two questions to Mr. Scott. There appeared, he said, to be a good deal of confusion amongst veterinary surgeons with regard to Jenner's work. Jenner passed the vaccine of smallpox through the cow and then used it for vaccine purposes, but for centuries the milkmaids in the West of England were in the habit of contracting cowpox from the cow and it was handed down by tradition that this protected them from smallpox. It seemed to him that all Jenner did was to simply use cow vaccine to protect his patients. He also took it that Mr. Scott meant that the tetanus bacillus did not act except in the pus producing organisms.

Miss CUST remarked that, while on the one side they felt the human practitioners scored in that they were able to ask their patients how they felt, on the other, one of the ways in which they scored was that their patients were insensible to any Coueism in any sense of the term. Again, if they were working with a dangerous disease, they could at least destroy their patients when they thought they were likely to affect the health of the community. There was one other point which she rose, in all humility, to make. It always struck her that, if they could only get at what it was that made certain animals resistant to certain diseases, and if they could only find out what the substance was, they would have made an extraordinary step forward.

The PRESIDENT remarked that there was one point in the paper they just had that some of them, who were rather in the sere and yellow leaf, would like to hear some expression of opinion upon. Mr. Scott had commented in his paper on the advisability of applying blisters and bleeding. He believed these were two points on which, in the Veterinary Profession, at least, there was great diversity of opinion, and it would be a source of much satisfaction to himself to hear the views of his fellow practitioners as to the application of counter-irritants in the case, say, of pneumonia.

Mr. FACER asked Mr. Scott if he had ever used mercurial salicylate?

Mr. SCOTT: No, sir, I have not.

Mr. MAYNARD was much in agreement with Mr. Caudwell that tetanus was found without any wound at all as well as with heavy suppurating wounds.

Another point with regard to immunology had reference to the action of nuclein. He had used it fairly freely and with very fine results, but he should like to hear the experience of others. It certainly increased the patient's resistance to the disease.

Mr. PACK remarked that, as far as fistula was concerned, he thought he could claim to have had his share, and the great thing, in his opinion, was to get drainage. He had cases where the pus was behind the shoulder blade and where it was impossible to get any drainage His experience of fistula was that the sooner one began to tackle it the better, but drainage was essential. With regard to tetanus, he believed under microscopical examination one had found the tetanus bacilli without any other organism, and they certainly got it without any apparent wound.

THE REPLY.

Mr. SCOTT, in replying to the discussion, said it would be very ungracious of him if he did not say how pleased he was to be there and to have the privilege of presenting his paper before that learned Society. While it would be invidious on his part to single out one debater from another, he was sure he was voicing the feelings of them all as well as his own when he said it was a great pleasure to see Dr. Seagar Thomas there that day and to have such a distinguished authority to open the discussion. Meeting as they did on a common platform, they could learn much from their medical confrères and perhaps they, in turn, might gather some useful knowledge from their discussions and from studying their archives. He was glad Dr. Thomas had raised the question of autogenous vaccines which were really the scientific acme of what vaccines ought to be. In the past one looked upon vaccines as specific in their action, but Wright and his co-workers were now inclined to the view that this specificity was not absolute. But, independent of these findings, he thought one would get better *data* in practice by always remembering the possible specific element and when one was dealing with auto-vaccines, provided the technique was correct, they were embodying the actual elements that were producing the disease, and it did not require any great stretch of imagination to realise that that must be more satisfactory than using a stock vaccine of uncertain content for, if they did know the bacteria present, they might be ignorant of the strain. There was one point raised by Dr. Thomas which well repaid him for his sixty mile motor journey that day and that was Dr. Thomas's experience of salicylate of mercury. If this preparation would go so far as he seemed to suggest and stimulate leucocytosis to the extent of 300 per cent. in so short a time, they could regard it as a very valuable asset to them in the protective rôle.

He was glad also that Dr. Thomas was in sympathy with his views as regards *fixation abscess*. He could assure members that in given selected cases it was a most valuable therapeutic asset and its simplicity of application was a commendable trait, while the question of pain raised by Dr. Thomas, as they knew, did not apply so much to their patients, animals being less susceptible to pain than man.

As regarded the serological tests mentioned by Dr. Thomas, these were carried out in the same orthodox manner as in human medicine. He had never heard, however, of auto hæmo-inoculation being applied in veterinary practice, but he had tried auto-pyo-inoculation in some chronic suppurative conditions with good results.

He was interested in Dr. Thomas's observations on Johnë's disease and his failure to detect the causal organism, but his finding of an abundance of streptococci instead. Possibly this was an end phase case where the primary organism had become " played out" by the running riot of the secondary streptococci.

With regard to the blood calcium content, he was not going to dogmatise to medical men, but he was quite satisfied that under certain conditions of chronic suppurations where the content was high, the last thing he would attempt to do would be to give a calcium compound. He would feel in doing that, that it was like giving a stiff dose of whisky to a man who was already suffering from delirium tremens. One wanted to give the exact opposite, i.e., a decalcifying agent.

Dr. Thomas had raised the interesting question of dosage. That would always be a problem to the immunologist whether he was dealing with the initial stage, from a bacterial point of view, or the more terminal phase, from the clinical aspect, and in this the immunologist and the careful clinical observer must go hand in hand and every case should be treated on its own merits. He might say, however, that the anti-genetic reactions were not so pronounced in horses and cattle as they were in man and the smaller animals.

Dr. Thomas appeared to be loath to use virulent cultures in his antigens, and he (Mr. Scott) was of opinion that medical men lacked courage on that point. By beginning with a sterile vaccine and gradually working up to a virulent antigen, the time would arrive when a virulent culture might be safely administered. Further, it would be found that the therapeutical value of the latter was infinitely superior to the former, for it was a well-recognised fact that the methods adopted, i.e., heat, chemicals, light, etc., to sterilise vaccines had a deleterious effect on their antigenetic value.

WORKSOP VETERINARY SURGEON'S FEE.

At Worksop County Court, the Royal College of Veterinary Surgeons applied for payment of a fee at the rate of one guinea a year, total four guineas, against William Brown, veterinary surgeon, of Avenue House, Worksop. Mr. A. E. Furniss was for the plaintiffs. On oath, Mr. Furniss produced a certificate stating that existing practitioners had to pay a guinea a year. The Judge (to defendant): Why haven't you paid? Defendant: I maintain that it is an examining body, purely and simply, and—— The Judge: But you will have to pay.—The defendant: I qualified thirty-one years ago. I maintain that I have not—— The Judge: But it is as clear as day, and I am surprised an educated man should object to pay. There must be judgment for the plaintiffs, with costs on Scale C.

The Veterinary Record.

4th April, 1925.

THE FOOT-AND-MOUTH DISEASE REPORT AND THE VETERINARY PROFESSION.

Looking at the Report of the Departmental Committee on Foot-and-Mouth Disease in more detail, we see many allusions to the veterinary profession and we find certain recommendations and criticisms which call for some comment. Here again is a Government Committee strongly in favour of whole-time appointments. They do not consider part-time appointments entirely satisfactory because a veterinary surgeon may find that his obligations as an inspector, if faithfully observed, may prejudice the interests of a client. They say the obligations are real, and the responsibility is frequently a heavy one. The inspector of a local authority should be a thoroughly competent official and free from the attachments of private practice. The system of payment by fees must inevitably tend to limit the employment of veterinary inspectors to specific enquiries and lead to the neglect of general duties such as the inspection of markets, slaughter-houses, piggeries and the supervision of the transit of animals. At present in the majority of boroughs which are local authorities there is comparatively little work for a veterinary inspector as such, although every local authority is required by statute to appoint at least one inspector. It would obviously be impracticable for these boroughs to appoint whole-time veterinary inspectors, but, with the greater areas and combination of districts secured by a reduction of local authorities, it should be possible for an advance to be made in this direction. In these conclusions the Committee are only confirming the findings of the previous Committee and at the same time concurring in the views of the Committee on meat inspection. It is evidently becoming obvious to those who have to study the modern conditions arising from Public Health requirements and the requirements for the prevention of contagious disease, that there must be a great increase in the number of whole-time appointments of veterinary inspectors to local authorities, and we think that the Committee's suggestion that there might well be a reduction in the number of local authorities would go a long way towards solving the difficulty of providing for these appointments. The veterinary inspector (whole-time) should have ample employment, if his duties are to include work both for the Ministry of Agriculture and also duties imposed under orders of the Ministry of Health, especially work under the Contagious Diseases of Animals Acts, Milk and Dairies' Act, Tuberculosis Order, Meat Regulations and Market Inspection. He should be able to command an attractive salary. The Committee also recommend the appointment of whole-time veterinary inspectors at all landing places for imported animals.

With regard to markets and sales, the Committee again point to the need for improved supervision and veterinary inspection. They cannot recommend that the veterinary inspection at all markets and sales should be compulsory, owing mainly to the cost involved, but they recommend that it should be enforced at all the principal store markets as a regular practice. It will be remembered that the previous Committee made some caustic remarks on this subject and commented upon the absurdly inadequate fees paid to veterinary inspectors. The Committee, however, realise that even efficient veterinary inspection at markets cannot be an absolute guarantee against the admission of an animal infected with foot-and-mouth disease, and recourse will always have to be made to the enforcement of restrictions on movement.

A further argument in favour of whole-time inspectors, brings the criticism of the Committee a little more home to us. Let us quote pars. 174 and 175 of the Report :—

> "Considerable damage has unfortunately been caused by the failure of veterinary practitioners to realise the necessity of wearing waterproof clothing and boots when visiting suspected cases of foot-and-mouth disease, and this is a direction in which improvement would be secured by the appointment of whole-time officers. In any case, however, it should be made obligatory for a veterinary inspector of a local authority to possess and to maintain in a satisfactory condition clothing and boots which can be efficiently disinfected, which should always be worn when entering any premises on which he has any reason to suspect the possible presence of foot-and-mouth disease."
>
> "It would be advantageous if a similar requirement could be made compulsory upon all veterinary practitioners. It is regrettable that members of the veterinary profession should so often fail to appreciate the necessity of adopting the most scrupulous care in order to avoid carrying infection in the course of their daily rounds."

It is very unfortunate that such criticism and advice should have been deserved. That it has been deserved

in a few cases is undeniable, but nevertheless it should be somewhat excusable when one considers the extreme infectivity of the virus of the disease and the lack of appreciation of some of the less experienced veterinarians concerning the great danger of spreading infection. The Committee also comment upon the reluctance (or is it lack of moral courage ?) of some veterinarians *at the first suspicion* to declare a diagnosis of the disease which may act to the detriment not only of themselves but of their clients. Time, experience, and education alone will remove cause for criticism in this respect.

The remarks of the Committee regarding the Ministry's staff are of especial interest to members of the "National" in view of the evidence which the Association laid before the Committee by deputation last July. Amongst other comments the Report states :—

> "As regards the inspectorate, however, the case was different. We considered their numbers so inadequate to deal with an extended outbreak, and the question so urgent, that we made pressing representations to the Ministry as to the necessity for an immediate increase, combined with improved conditions of service. We are glad to say that these recommendations have been, in the main, carried out, although certain details of salary which are outside our purview are still under consideration. Under these circumstances, we do not think it necessary to add to the bulk of our report by detailing particulars to justify recommendations which have already been given effect to."

Not only are we gratified to see it put on record in the Report that our representations were fully justified —so much so that the Committee made "pressing representations" themselves—but also we are glad to see that the whole question of the salaries is not finally closed, that certain details are still under consideration. We trust something more—which justice is still crying for—will soon be done. As we have previously pointed out in these columns, the one man who has had the whole responsibility of this terrible outbreak on his shoulders, who has had to contend against overwhelming odds and difficulties with an inadequate staff and who nevertheless has retained the goodwill of Agriculture and has at last obtained the mastery of the disease and successfully carried through his bold policy—this man, Sir Stewart Stockman—apart from the lasting gratitude and support from the veterinary profession, has received *nothing*.—FIAT JUSTITIA !

Foot-and-Mouth Disease Report: Summary of Principal Conclusions and Recommendations.

THE BLACKPOOL OUTBREAK AND ITS CONSEQUENCES.

Disease was introduced into the landing place at Fleetwood by human agency, and the animals so infected were responsible for the original outbreak in Cheshire. (Paras. 10, 14.)

There was inaction for nearly 15 hours when every minute was vital. We place the primary responsibility for this upon Mr. P. Manuel, M.R.C.V.S., of Crewe. (Para. 16.)

POLICY.

A policy of isolation would be equivalent to the abandonment of any hope of eradicating the disease from this country.

We do not consider that a system of isolation which involved the partial or complete segregation of human beings would be tolerated as a measure connected with animal diseases. (Para. 34.)

The failure of 1923 was due to the faulty manner in which the policy was prosecuted rather than to any defect in the policy itself. (Para. 35.)

The control of foot-and-mouth disease is clearly a matter of national importance. (Para. 37.)

Isolation as a policy would transfer the burden of direct loss from the nation to the individual but it would undoubtedly re-act on the nation. (Para. 39.)

Unless the slaughter policy is applied in future with more promptitude and the organisation for dealing with emergency situations is materially improved, the policy will be discredited and might have to be abandoned with disastrous consequences. (Para. 45.)

If the real seriousness of the situation had been realised at an earlier stage and the same measures taken which were afterwards adopted, much loss and expenditure would have been avoided. (Para. 46.)

The temporary abandonment of salvage in January, 1924, was justified. (Para. 51.)

INFECTED PLACES.

The indifference of owners to the importance of prompt reporting is the most fruitful cause of the spread of disease and the most difficult one to provide against. (Para. 53.)

The responsibility for final diagnosis should remain entirely with the Ministry. (Para. 56.)

Disinfection of premises, whether after slaughter or isolation, should be a responsibility of the Ministry. (Para. 75.)

GENERAL MOVEMENT RESTRICTIONS.

We are unable to recommend any reduction of the size of infected areas in the first instance. (Para. 90.)

We are satisfied that the agricultural community would not tolerate a reversion to the old procedure in the matter of restrictions. (Para. 91.)

We are satisfied that the complete control of human movement within an area of even two miles from an infected place would be practically impossible. (Para. 100.)

GENERAL PRECAUTIONS.

Disinfection of persons arriving in this country from the Continent is impracticable. (Para. 115.)

The boiling or cooking of all refuse before it is fed to pigs is very desirable. (Para. 122.)

There are three possible courses to adopt when a landing place is comprised within a restricted district. The decision as to the adoption of one of these alternatives must rest with the Ministry. (Para. 128.)

We are unable to recommend the general prohibition of the importation of hay and straw used at the time of importation for packing merchandise. (Para. 135.)

The disinfection of vehicles used for the conveyance of livestock otherwise than on a railway has much to recommend it. (Para. 144.)

We cannot recommend that veterinary inspection at all markets and sales should be compulsory. (Para. 148.)

The detention of all animals after exposure in a market or sale is desirable but would be very difficult of enforcement. (Para. 152.)

We are unable to recommend any departure from the present practice in regard to hunting. (Para. 156.)

LOCAL AUTHORITIES—ADMINISTRATION.

The recommendation of the 1922 Committee that Regulations under the Foot-and-Mouth Disease Order of 1895 should be made only by a joint committee representative of the local authorities in the geographical area of the county must be abandoned. (Para. 171.)

LOCAL AUTHORITIES—ORGANISATION.

It is desirable that the veterinary inspector of a local authority should be free from the attachments of private practice. (Para. 172.)

The chief constable of each local authority should be the chief inspector for the purposes of the Diseases of Animals Acts. (Para. 177.)

INSURANCE.

Administration of a compulsory insurance scheme would be difficult and costly. (Para. 184.)

The eradication of Foot-and-Mouth Disease has been accepted by the State as a national liability and if the disease is not to become endemic the State must either continue to accept this liability or compel stockowners to shoulder a still larger one. (Para. 185.)

SUMMARY OF PRINCIPAL RECOMMENDATIONS.

POLICY.

Agricultural workers necessarily unemployed through slaughter of stock should receive from the State the same benefits as they would have received had they been within the scheme of the Uemployment Insurance Act. (Para. 35.)

Sums drawn from the local taxation account should be refunded. (Para. 37.)

A test should be made of a reputed preventive which has received considerable publicity in Cheshire. (Para. 42.)

Until a preventive agent is available the slaughter policy should be continued. (Para. 43.)

INFECTED PLACES.

Continuous police supervision should be provided until the arrival of the Ministry's Inspector. (Para. 58.)

Provision should be made without dealy for the automatic imposition of restrictions when, in the opinion of a veterinary inspector, disease exists, or there are reasonable grounds for suspecting its existence. (Para. 59)

Section 8 of the Diseases of Animals Act, 1894, should be amended, and a simplified procedure adopted for defining infected places (Para. 63.)

Burial should be adopted, where practicable, in preference to cremation. (Para. 68.)

Salvage should be dispensed with in an initial outbreak save under exceptional circumstances, and in other cases it should be left to the discretion of the inspector in charge. (Para. 69.)

Restocking of infected premises should in all cases in the first place be tentative and on a small scale, the Ministry meantime, retaining its control of the premises. (Para. 76.)

Disinfection of infected places should be speeded up. (Para. 78.)

VALUATION AND COMPENSATION.

A panel of valuers should be appointed, and a value awarded by a valuer from the panel should be final. (Para. 80.)

Valuers should not be remunerated by a percentage of the value awarded. (Para. 81.)

A revised basis of valuation should be adopted in the case of all animals showing visible symptoms of the disease at the time of the diagnostic visit, a uniform deduction of 10 per cent. being made from the full value of all such animals. (Para. 83.)

The Ministry should be responsible for the payment of compensation in respect of all carcasses or parts of carcasses condemned as affected with Foot-and-Mouth Disease except in the case of animals licensed to premises for slaughter within a prescribed period, and improperly detained beyond that period. (Para. 85.)

GENERAL MOVEMENT RESTRICTIONS.

The infected areas system of restrictions should be continued but the Ministry should exercise a close supervision over the procedure of local authorities. (Para. 93.)

The responsible officers of the Ministry should have discretion to reduce an infected area at an earlier date than 21 days if the circumstances warrant it. (Para. 94.)

Periodical disinfection of all places in which animals are habitually slaughtered should be insisted upon, and the use of premises incapable of efficient disinfection prohibited. (Para. 99.)

Slaughter-house offal should not be permitted to be removed from the district of one local authority to that of another without the consent of the receiving local authority. (Para. 99.)

Special efforts should be made to organise effective supervision for infected places. (Para. 102.)

The Ministry should confer with the other Departments concerned with a view to provision being made for a contribution from the Exchequer towards the cost of additional police assistance in a large outbreak. (Para. 102.)

Markets and farm sales should not be permitted in a restricted district for at least a week or ten days from the date of the initial outbreak. (Para. 103.)

GENERAL PRECAUTIONS.

The use of the Harwich-Zeebrugge train ferry for the importation of freshly-killed calves, and freshly-slaughtered South American cattle would open up a new and dangerous source of infection which should receive the attention of the Ministry. (Para. 117.)

The Ministry should invite the Foreign Office to approach foreign Governments with a view to the cessation of the practice of carrying animals as ships' stores on vessels trading to this country. (Para. 118.)

Railway vehicles used for the conveyance of inported hides and skins should be required to be disinfected, or

alternatively special vehicles should be appropriated solely for that trade. (Para. 123.)

The Ministry should consider the practicability of requiring the disinfection of sacks which have contained imported feeding stuffs before they are permitted to circulate in the ordinary course of home trade. (Para. 125.)

All landing places for imported animals should be staffed normally by whole-time inspectors. (Para. 132.)

Packing used for or about meat or meat products should be required to be destroyed at the port of landing and packing cloths at the place of unpacking.

Sales of imported trees and shrubs packed in hay or straw should be prohibited on any premises which are being used for sales of live stock. (Para. 136.)

Where animals in transit would reach their destination within two or three hours in excess of the period prescribed for watering, some latitude should be allowed to railway companies in the matter of untrucking for that purpose. (Para. 142.)

The Ministry should require the use of separate pens for the feeding and watering of animals in transit. (Para. 142.)

Premises habitually used for the reception or detention of animals prior to or after sale on adjacent premises which are required by the Markets and Sales Order of 1910 to be paved should also be required to be paved. (Para. 146.)

The Ministry should prohibit the use of lairs (other than grass enclosures), which cannot be properly cleansed and disinfected. (Para. 147.)

Market authorities and auctioneers should be required to keep a record of the destination and consignee of all stock leaving their markets or sales. (Para. 150.)

Stockowners should be required to keep a register of movements on to or off their premises. (Para. 151.)

Local Authorities—Administration and Organisation.

The reduction of the number of local authorities recommended by the 1922 Committee is endorsed. (Para. 158.)

Regulations made by local authorities under the Foot-and-Mouth Disease Order of 1895 should not be operative unless and until confirmed by the Ministry. (Para. 166.)

Veterinary inspectors of local authorities should be required to possess and maintain clothing and boots which can be efficiently disinfected, and which should always be worn when entering any premises on which there is reason to suspect the existence of disease. (Para. 174.)

Insurance.

We recommend that the present system of State compensation should be continued, and that no scheme of compulsory insurance should be instituted. Para. 185.)

We recommend that certain consequential insurance policies which may induce carelessness should be discouraged. (Para. 188.)

Tuberculosis in Cows.

A Possible Blessing in Disguise!

M.R.C.V.S.'s Statement.

Under the above headings the *Newcastle Daily Journal* publishes the following in its issue of March 21st, 1925.:

"Mr. J. G. Deans, M.R.C.V.S., Bishop Auckland, writes: Having read in your paper some articles on tuberculosis, I would like to state that the matter, in my opinion, is a storm in a teacup.

"The folly of to-day is the wisdom of to-morrow, and I know that what I have to say on the subject will call down on me the wrath and indignation of scientists generally.

"The bacillus of tuberculosis in a cow is not the same as that in the human being. If it were the same and so communicable as some believe, all the nations of the world would have been wiped out long ago.

"It is common knowledge that tuberculosis is far more prevalent in the towns, where children seldom see a cow, let alone spend their lives with them, than it is where country boys and girls are brought up in contact with them daily.

"It may be that tuberculosis in a cow might be a blessing in disguise. I would like to ask: Why do you inject a person who has been wounded with anti-tetanic serum, to prevent tetanus and lock-jaw, if it is not to permeate the system with the same bacillus as the bacillus tetanus, with the sting taken out of it?

"Also, is it not a fact that the lymph from the small-pox of the cow is injected into a child to prevent that child's taking the smallpox of the human being?

"Last year my household, consisting of my father-in-law, my wife and daughter, two maids and a groom, and myself, all lived on the milk from a cow, which was, to use a vulgarism, rotten with tuberculosis, and we are all fit and well. I also had a friend, a chronic consumptive, staying with me, and he had a quart of this milk to drink every day, just as it came from the cow, and he improved and put on flesh during the time he was drinking this milk.

"We milked this cow until it got so weak that it had to be destroyed, and *post-mortem* revealed tuberculosis general in every organ of the body, and I am of opinion that this cow would have not reacted to the tuberculin test. That is, had it been injected with tuberculin to see whether it had tuberculosis or not you would have got no reaction, as, where the disease is in an advanced stage, you do not get a reaction from the test.

"I consider that the test, as a diagnostic agent, is not authentic, because you can get all sorts of reasons for a rising temperature, which have nothing whatever to do with the test, and therefore many sound animals would be condemned which are not suffering from tuberculosis at all."

* * * * *

The above article produced the following replies, published in the *Newcastle Daily Journal* of March 23rd, 1925.:

"Sir,—Mr. J. G. Deans's statement in the *Journal and North Star* will not, I hope, call down 'the wrath and indignation of scientists generally.' Though I think he has, on a basis of truth, erected a structure which will not bear investigation. But he is quite entitled to his own views, which, however, may be detrimental to the public weal.

"Mr. Deans appears to have mixed up the organisms of lock-jaw and tuberculosis with the poison or secretion of the organisms, and he has left out one most important consideration. Children do not acquire bovine tuberculosis by contact with cows, but by drinking milk containing the living organisms. And their secretion of tuberculin may or may not be a blessing in disguise; whilst in lock-jaw on the other hand, the secretion is deadly.

"The chief reasons why the nations of the world have not been wiped out by bovine tuberculosis is not that the bacillus of the cow is not communicable to man, but that

the lining membrane of man's bowels is usually healthy and intact. Many also have a special resisting power. But where a child has an abrasion in the bowel wall from irritation or indigestion (as have many bottle babies fed with tuberculous milk), then there the organism can enter and do its deadly work.

"Mr. Deans asks: why is a 'wounded' person infected with anti-tetanic 'serum,' if it is not to permeate the system with the same bacillus'? He admits the person has to be 'wounded,' i.e., the skin must be broken to admit the 'bacillus.' And this bacillus secretes a poison which sets up lock-jaw. And we inject serum as an antidote to the poison, but we do not 'permeate the system with the same bacillus.' With calf's lymph, we produce a modified smallpox organism, thus protecting against a more dangerous form. But the organism had been tamed or modified, and we should never use the causal organism.

"But the organism of tuberculosis in cows is untamed, as it is an organism which can destroy the cow itself, and which brings appalling suffering to human children. And as in vaccination we have to wound the skin to admit the modified organism, so in the child's bowel there must be an opening or abrasion to admit the bacillus of cows' milk. And I think Mr. Deans should be very sure of his ground before advocating the use of tuberculous milk.

"With regard to his drinking the milk of a cow 'rotten with tuberculosis,' one can only compliment Mr. Deans upon his courage and upon the tightness of the bowel walls. But may I point out that he could put his hands (if unwounded) into soil or water (swarming with lock-jaw organisms) with equal safety? The patient with chronic consumption was also probably in the same fortunate condition, or he might have acquired abdominal as well as pulmonary tuberculosis.

"The tuberculin of this cow's milk might or might not do good, whilst any nutrition in the milk naturally would be beneficial. But why not, in the usual way, give tuberculin in known doses, without the terrible danger of the organisms themselves?

"Regarding the diseased cow not reacting to the tuberculin test. It would, I think, be most unlikely to do so, as it would be saturated with its own tuberculin. And I think Mr. Deans is wrong in making this a reason to denounce the test, as in the hands of other veterinary surgeons I have been astonished at its accuracy.

"I am personally interested in the question, as we had some 16 out of 23 cows which reacted at a certain sanatorium, and I did not consider it right to give their milk to tuberculous children. In one case there the best cow reacted, and when slaughtered some years after, a nodule of disease was found in its pleura.

"And the generalised tuberculosis which Mr. Deans found *post-mortem* might, in my opinion, have come from a similar source, as witness cases of acute generalised tuberculosis after a flare up in human beings. Even, therefore, in a cow apparently healthy, if a nodule bursts, living organisms would almost certainly appear in the milk. And one can never know when this may occur.

"In my opinion, therefore, all milk from unknown cows should be boiled, and an orange, or its juice, be given daily to the child or baby. Mr. Deans's capacity is well-known, and he has boldly expressed views which he honestly holds, but I venture to question their soundness, and to ask the re-consideration which their importance merits."—T. M. ALLISON, M.D.

* * * * *

"Sir,—Mr. Deans' letter in the *Journal and North Star* of the 20th inst. regarding tuberculosis in cows demonstrates vividly the minute amount of knowledge which the contributor possesses as regards bacteriology in general and tuberculosis in particular. As a member of the same profession, it grieves me to think that medical men will have read this contribution to the subject of tuberculosis. They will think little of modern veterinary knowledge if they take this as a sample.

"Bovine tuberculosis *is* transmissible to the human. This is what Dr. Griffiths says about the point at issue:—

"The effect of this infection of market milk is shown in the following figures extracted from a report by Dr. Griffiths, whose authority to speak on the subject cannot be questioned. The figures show the results of the investigations of 1,068 cases of human tuberculosis derived from all parts of Great Britain and including all types of cases.

Age.	No. of cases.	Percentage Bovine.
0—5 years	221 ...	37.55
5—10 years	312 ...	29.45
10—16 years	150 ...	14.66
16 Upwards	384 ...	6.25
Total	1,068* ...	20.7

*Includes one age not stated.

"I think we must put more reliance in the Doctor than in Mr. Deans.

"If these figures do not convince, let me quote those of Dr. Guy, the eminent Medical Officer for the City of Edinburgh. Dr. Guy states in his report for the year 1922:

"'The bovine type of tubercle bacillus is responsible in varying proportion for the different forms of non-pulmonary tuberculosis. It causes at least 30 per cent. of all gland cases, at least 18 per cent. of all meningeal cases, and 50 per cent. of abdominal forms of the disease, 58 per cent. where the bones are affected, and 50 per cent. of the lupus cases.'

"When these percentages are applied to the 485 new cases of non-pulmonary tuberculosis notified in Edinburgh in 1922, it would appear, from the classification given to these new cases by Dr. Guy, that approximately 30 per cent. of the total number of new cases notified in 1922 in the City of Edinburgh were attributable to bovine infection.

"Surely Mr. Deans knows that it is not necessary to live with, or see a cow, in order to contract the disease; the town-dweller usually gets it through the milk supply. Furthermore, the children of the country have available to them fresh air *ad libitum*—and there is nothing like fresh air to combat tuberculosis. The town child rarely has this opportunity of taking advantage of Nature's gift whereby disease may be withstood, and that is why they are sent to a sanatorium for treatment.

"Mr. Dean's knowledge of bacteriology may be gauged by his statement that to combat the tetanus or lock-jaw bacillus, we must permeate the system with the same bacillus as that which causes lock-jaw. Further on, he has the temerity to define anti-tetanin 'as a serum containing the tetanus bacillus with the sting taken out of it!' Perhaps we should be sympathetic and not critical.

"Now that I have enlightened Mr. Deans by giving him Drs. Griffiths' and Guy's figures, I feel confident that he would not have fed little children on the milk from that tuberculous cow.

"It is evident that Mr. Deans does not know that there are means of testing cattle for tuberculosis other than by the subcutaneous test, which solely depends on a temperature reaction. I would strongly advise him to become conversant with the ophthalmic and intradermal technique where a temperature reaction is not at all necessary, as would have been the case where the subcutaneous test had been applied. Mr. Deans' cow would have reacted boldly to the ophthalmic and intradermal method if there had been need to apply a test at all, as I imagine that a clinical examination of Mr. Deans' cow by a very ordinary veterinary practitioner would have revealed incontrovertible evidence that tuberculosis was in evidence."—CLEMENT ELPHICK.

Newcastle, March 22.

* * * * *

"Sir,—I was very interested in Mr. Deans letter concerning tuberculosis of human and bovine origin. He says 'the bacillus of tuberculosis in a cow is not the same as that in a human being, and therefore not communicable to the latter.'

"We may, I think, recognise four types of the tubercle bacillus, the human, bovine, avian, and that isolated from cold-blooded animals, such as fish. They are simply

varieties of the one organism, and it is by no means certain that they cannot be transformed the one into the other. The morphologic differences between them are not sufficient to differentiate these various types.

"There is no reasonable doubt that the bovine tubercle bacillus may infect the human. Indeed in cases of tuberculous cervical glands in children over 80 per cent. are caused by the bacillus of the bovine type. This, in itself, should illustrate the danger of feeding unsterilized cows' milk to children under sixteen years of age. The danger to the adult would appear to be almost negligible.

"The question of humans acquiring an immunity to tuberculosis by drinking tuberculous cows' milk over a prolonged period is an interesting one, but one which I would prefer to leave to the bacteriologist. In cattle it would seem that a true immunity is not acquired, but that when a previous local focus of infection is present, the body acquires a kind of tolerance and prevents the galloping form of the disease occurring.

"This body resistance, may, in animals, be broken down by too close housing or a high milk production. I would suggest, by analogy, that, while children in the country are probably more often exposed to risk of bovine tubercle infection than are children in towns, it is not the fact, as Mr. Deans suggests, that they cannot be infected with the bovine tubercle bacillus, but that their healthy mode of life enables them to maintain a high body resistance."—H. THORNTON, B.V.Sc., M.R.C.V.S., D.V.H. (Liv.).

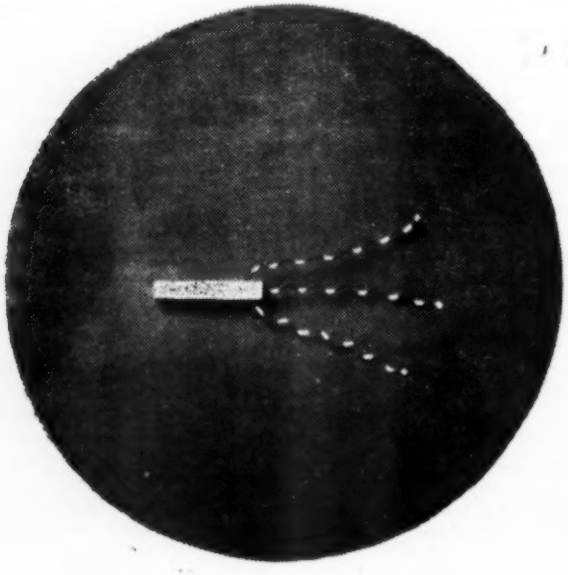
Forest Hall, March 21.

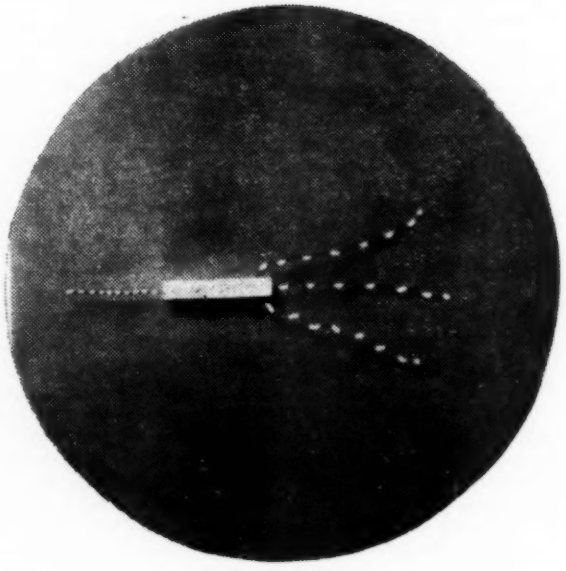
* * * * *

We subjoin Mr. Clement Elphick's comment to ourselves:

THE NEW BACILLUS—B. DEANSII.

As I had never read in any treatise on bacteriology that the bacillus of tetanus as found in anti-tetanic serum had a sting--*vide* Mr. Deans—I approached that eminent authority Professor Letemoff and as a result he has sent two photographs of two bacilli, one with the sting *in situ* and the other removed. I thought that these photographs might prove of interest to your readers. Professor Letemoff informs me that the twin flagellæ at the one end propel the body of the bacillus forward at an amazing speed and in the manner of the sword-fish impale the white corpuscles on the sting—at the opposite end to the flagellæ—as the bacillus dashes through the blood stream. He also observes that the grey-matter centres—at either end of the bacillus—are connected by a tapering ganglion in order that the flagellæ may know what is in the mind of "the business-end" of the bacillus. The bacillus has a keen appreciation for the 'policemen' of the blood stream and the Professor hopes in the near future to be able to inform learned societies of the number of white corpuscles which the sting is able to impale in a given period of time.—CLEMENT ELPHICK.





King's Bench Division.

PROFESSIONAL EXPENSES: DEDUCTION FROM TAX.
SIMPSON (Inspector of Taxes) v. TATE.
(*Before* MR. JUSTICE ROWLATT).

(Reprinted from *The Times*).

This was a case stated by the Commissioners for the Special Purposes of the Income Tax Acts. The respondent, Dr. John Tate, the County medical officer to the Middlesex County Council, appealed to the Commissioners against an assessment to income-tax in the sum of £1,337 for the year ended April 5th, 1924, under Schedule E of the Income Tax Act, 1918, in respect of his salary as the county medical officer.

During the year in question the respondent paid subscriptions to various societies amounting in all to £8 6s. 6d., and he claimed that the money was expended wholly, exclusively, and necessarily in the performance of his duties as the county medical officer and should be deducted from his salary of £1,337 in order to arrive at his correct liability to income tax under Schedule E. The sum of £8 6s. 6d. was made up by subscriptions as follows: Fellow of the Royal Society of Medicine, £5 5s.; Fellow of the Society of Medical Officers of Health, £1 10s. 6d.; Fellow of the Royal Institute of Public Health, £1 1s.; Association of County Medical Officers of Health, 10s. The respondent gave evidence before the Commissioners and proved the following facts:—(*a*) He joined the Royal Society of Medicine in order to have the benefit of the meetings of the epidemiological branch of the society, and to obtain the transactions published by that branch; (*b*) the Royal Society of Medicine included a section dealing with infectious diseases, a subject of the greatest importance to county medical officers; (*c*) the Society of Medical Officers published a journal dealing with public Health matters, and took an active interest in questions affecting the *status* and salaries of public health officers; (*d*) he became a Fellow of the Royal Institute of Public Health in order to get their journal which contained articles on matters relating to public health; (*e*) he became a memberof the Association of County Medical Officers of Health to enable him to ascertain how similar work was carried out throughout England; (*f*) membership of the above societies was voluntary on the part of the respondent and was not required as a condition of his appointment, but it was customary for county medical officers to be members of those societies; (*g*) without the journals and meetings of the societies the respondent would have had great difficulty in keeping in touch with all recent advances in sanitary science and the medical questions affecting public

health, and in many instances would have been unable to obtain the knowledge. The knowledge so obtained by the respondent enabled him to perform his duties with increased efficiency.

It was contended by the respondent that the sum of £8 6s. 6d. was a proper deduction from the emoluments to be assessed under Schedule E; and that the assessment should be reduced to £1,329.

It was contended for the Crown that the money was not so expended, and was not, therefore, a proper deduction.

The Commissioners found in favour of the respondent and the Crown now appealed.

The Solicitor-General (Sir Thomas Inskip, K.C.) and Mr. R. P. Hills appeared for the Crown; and Mr. J. H. Stamp for the respondent.

JUDGMENT.

Mr. Justice Rowlatt, in the course of his judgment, said that the decision of the Commissioners could not be supported. If the conclusion was a question of fact there was no evidence to support it. Certain expenses were allowed to an office-holder. But an office-holder, as he understood the position, was a person who was obliged to qualify for his office, who had to get to the place where his duties were carried out, and who was allowed certain expenses in performing them. The respondent had first to qualify himself before taking up his office, and he continually and very properly kept himself fit by continuing in touch with the highest knowledge his profession had reached. But he did not join the societies for the purpose of treating patients, but for the purpose of keeping himself qualified as a man to hold his office. The whole question was a matter of principle. Subscriptions to professional societies, and the buying of professional literature, and all the expenses involved in keeping a man fit for the work he was doing could not be allowed. Otherwise any man belonging to any profession could deduct all such expenses and there would be no end to it. The principle was quite clear and none of the expenses incurred by the respondent could be deducted. The appeal would be allowed with costs.

CLINICAL AND CASE REPORTS.

Different Clinical Forms of Distemper.

By W. S. STEVENS, M.R.C.V.S., Wincanton.

Possibly the following clinical observations on a case of distemper in a Pekingese bitch and her puppies may help to elucidate the muddle whether the different forms of distemper have or have not the same origin.

A Pekingese bitch, age 1 year 6 months, quite healthy, and as a puppy at three months time vaccinated with a bacterin against distemper, was sent away for stud purposes. On returning home she was isolated as a routine procedure, and five days later was noticed to be losing her usual high spirits. She ran a temperature and developed the usual catarrhal form of distemper with considerable malaise.

The catarrh attacked the upper air passages and large bronchi but pneumonia did not supervene; she also had severe enteritis with diarrhœa.

The bitch made a good recovery and was again clinically healthy and lively in four weeks time. She was not allowed much exercise, was still isolated and carrying puppies. She eventually whelped six apparently healthy puppies, except one, which had a hare lip and cleft palate and died the next day.

At the end of a week one puppy was noticed off colour, developed enteritis and died. A few days later another puppy's eye was noticed to be clouding over the cornea; the opacity increased, involving the deeper structures of the eye. It was destroyed.

After the lapse of a short period a further puppy developed catarrh of the upper air passages. It was found dead ten days later, and *post-mortem* revealed intensive pneumonia.

A further puppy developed epileptic fits, and died.

The last puppy lived.

As the bitch was strictly isolated from the time she returned from her visit and until the last surviving puppy was weaned, I deduce that the clinical forms of distemper exhibited by the different puppies were all the result of one common original infection from the mother.

Of course, this would not rule out any secondary invasions of bacteria from the air or dust.

Three cases of Luxation of the Cervical Vertebrae between the first and second Cervical Vertebrae.

By Captain GLYNN LLOYD, D.S.O., R.A.V.C.,
Equitation School, Weedon.

(1) Hostess. Army No. 71773. 8th December, 1924.

Fell when jumping over a bank with her nose outstretched, and the underlip striking the ground.

Death instantaneous.

Post-mortem. Complete dislocation between the atlas and axis. The beak of the axis had passed anteriorly under the base of the atlas with complete rupture of the spinal cord.

(2) Latched. Army No. 68870. 27th January, 1925.

Stumbled when being loose-jumped, falling on one knee, the underlip striking the ground violently. The horse got up with its neck outstretched and walked back to the stable with its nose poked out. The head could not be extended or flexed either directly or laterally by the animal. The horse sweated profusely and was in great pain. In about half an hour's time violent symptoms were evidenced; all powers of co-ordination were lost, and the animal collapsed. The horse was destroyed.

Post-mortem. Complete luxation between the atlas and axis. The beak of the axis had passed anteriorly under the base of the atlas. The spinal cord was intact but the membranes were torn, and hæmorrhage was present.

(3) Greedy Girl. Army No. 73173. 9th March, 1925.

When being mounted, reared, and fell over backwards, striking its head on the corner of a wall. It attempted to rise again and struck its underlip forcibly on the ground. Collapsed and died immediately.

Post-mortem. Small lacerated wound on the off side of the neck near the poll, penetrating as far as the wing of the atlas.

Complete dislocation between the atlas and axis. The beak of the axis had passed anteriorly under the base of the atlas. Spinal cord and membranes intact; severe hæmorrhage surrounding the spinal cord.

DIVISIONAL REPORTS.

West of Scotland Division.*

ANNUAL MEETING AT GLASGOW.

The Annual General Meeting of the above Division took place in the Glasgow Veterinary College, 83 Buccleuch Street, Glasgow, on Friday, February 6th, at 3 p.m.

The President, Mr. Hugh Begg, presided, and the following members and visitors also attended:

Dr. Whitehouse, Professor Gaiger, F.R.C.V.S., Professor Robb, Messrs. Roy, MacFarlane, Brown, Laird, Orr, Hill, Bristow, Pool and Weir. Several students from the college were also present.

Apologies.—Messrs. J. G. Macgregor and J. D. Pottie.

PRINCIPAL DR. WHITEHOUSE gave a very interesting demonstration of the use of the Simplex Equine Operating Table, in the college yard, in which he was very ably assisted by a number of students.

Each man was drilled for his particular task, and the demonstration was carried out without the slightest hitch. Dr. Whitehouse pointed out the advantages of the table, and stated that he had, while in the American Service, used this pattern of table very often and found it of great service, provided that each man knew his job and did it quickly, and all worked simultaneously. He had found it necessary, sometimes, to give chlor. hyd. or cannabis indica some time before putting the animal on. The members were very much interested and many asked questions about its use. Dr. Whitehouse said that it was his desire that any member of the Division, or non-member practising in the district, should make use of the table at any time; the students being willing to give their services in return for a demonstration by the practitioner.

The election of Office Bearers for the year 1925, was then made.

The following were those elected:—

President.—Wm Roy.

Vice-Presidents.—Dr. Whitehouse and Mr. Wm. Robb.

Secretary and Treasurer.—G. W. Weir.

Auditors.—Robert Mitchell and James Macfarlane.

Representatives to Council N.V.M.A.—Dr. Whitehouse and Professor S. H. Gaiger.

The Treasurer then presented his Balance Sheet for the year 1924, which showed a balance in the bank of £33 7s. 2d. This was considered very satisfactory, and was approved by the meeting.

On the motion of the TREASURER, it was agreed to send £5 as a donation to the Victoria Veterinary Benevolent Fund.

It was unanimously agreed to support the candidature of Dr. Whitehouse, as a representative to the Council of the R.C.V.S., and the Secretary was instructed to ask the support of the other Scottish Divisions in this matter.

The meeting at this juncture was adjourned for tea at the Grand Hotel.

* Received on February 8th, 1925.

On resuming, the newly elected President, Mr. Wm. Roy, M.R.C.V.S., a very old member of this division, and one of the faithful and regular attenders of its meetings, took over the reins of office, and in a few words thanked the members for electing him as their President.

Mr. MACFARLANE then brought forward a very interesting case of fracture and consequent anchylosis of the atlas and axis of a horse, and exhibited the bones which were examined carefully by each one present. At the September meeting Mr. Macfarlane had this horse brought to the college, and the members then had the opportunity of seeing the animal alive, and examining it.

Specimen.—A fractured atlas with complete osseous fusion of the axis to the atlas at a rather acute angle.

The accident happened on the 11th day of February, 1921, and the animal was sold to be destroyed on the 7th October, 1924.

The subject was a grey Percheron Gyp Gelding, aged ten years, and bought from the War Office at Swaythling, on 1st December, 1919.

On the afternoon of the date of the accident, this horse was pulling his lorry up West Nile Street, when a block occurred, and this horse's head was forced on to the top of a lot of bags of sugar which constituted the load of the lorry in front of him. He choked and fell, his head hitting the kerb stone at the edge of the pavement, violently. He was able to walk home, and on my advice was not to be disturbed, and put into slings.

The following morning his nose was almost touching the ground and his neck was awry. I decided to give him a chance, so gave him 3 drachms of filtered Ext. Cannabis Indica (Willows) intravenously, and repeated it next day, then every second day for three times. Swelling on the top of the head was considerable, and looked like as if it might burst. It was painted occasionally with tincture of iodine, and hot cloths applied. The swollen parts were blistered on the 15th of March, and again on the 17th of May.

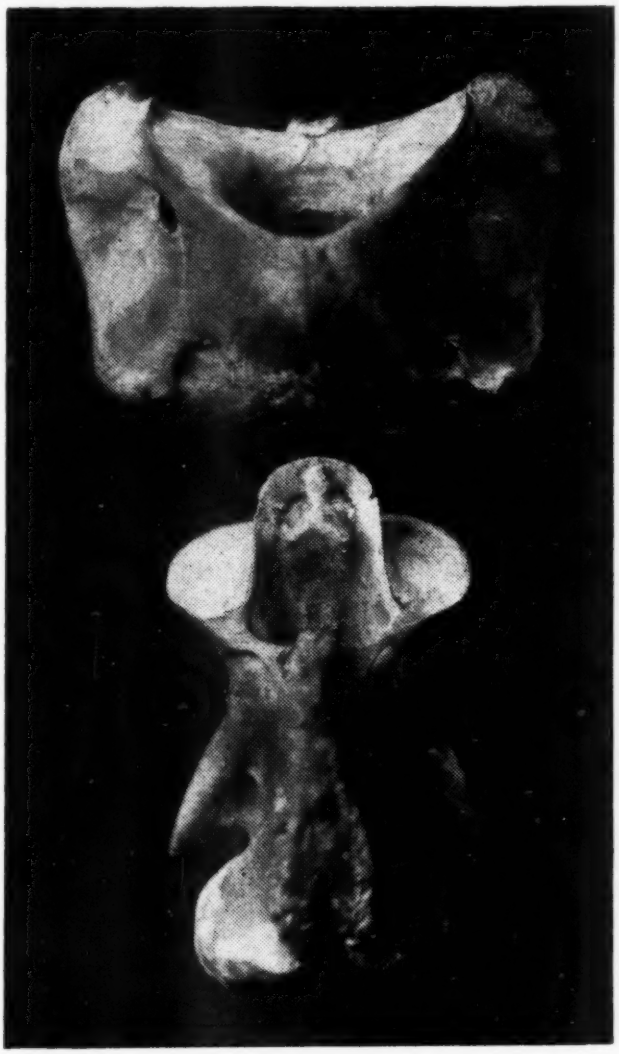
The animal slowly came to be able to elevate his head, but held it awry with a hollow to the near side in the region of parotid gland.

He trotted sound and was taken out of slings on the 9th May, but still had difficulty in rising, and though on special diet, he had lost condition badly.

On May 27th, 1921, he was put to grass and brought in again on the 19th September, very much improved in condition, and able to lie and rise, and since then he has worked continuously in a light lorry.

A month before he was sold, December, 1924, he could not rise without assistance, so I kept him in to see if he would improve with rest. His condition improved and he was still trotting sound, but always had difficulty in rising, so, on my advice, he was sold to be destroyed.

Mr. JAS. LAIRD, spoke to a case of Celosomian Monstrosity (cow). The fœtal intestines were in the vagina and on further exploration only the vertebral column and the ribs, bent the reverse way, could be found There was no thorax or abdomen and the legs



NORMAL ATLAS AND AXIS.
The atlas showing the normal structure is reversed.

were protruding upwards instead of down. After peforming embryotomy, which consisted of first pulling out the intestines, and then severing the vertebral column, the fœtus was delivered.

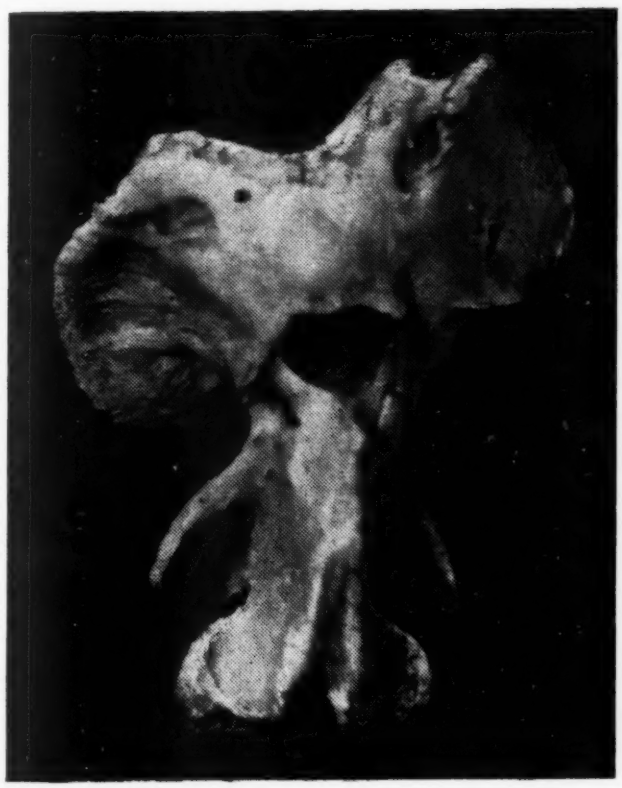
The legs, both fore and hind were undeveloped above the elbow and the stifle, *i.e.*, there were no shoulders on quarters.

Mr. DAVID BROWN, said that he was called to a pony whose foot had got caught in a gutter; the pony fell tearing the hoof partially off—on raising the pony the hoof sprang back into place. The pony was now doing well.

Mr. Brown also described a calving case, in which two legs were presented up to the hocks. Pulling was tried, but there was no movement of the fœtus. He cut through the sacrum and pulled the hind legs away. He found two other hind legs and repeated the operation. The fœtus, then delivered, was discovered to have one head, one thorax, body bifurcated behind thorax and two pairs hind legs.

After a discussion of these cases and the usual votes of thanks, the meeting closed.

GEORGE W. WEIR, M.R.C.V.S., *Hon. Secretary.*



DISEASED ATLAS AND AXIS FUSED.

Southern Counties Division.

MEETING AT SALISBURY.

An interesting paper on "Some Observations on Immunology in General Practice," by Mr. W. Scott, F.R.C.V.S., of Bridgwater, the discussion on which was opened by Dr. G. D. Seager Thomas, was the outstanding feature of the December meeting of this Society, which was held at the Red Lion Hotel, Salisbury, on the 18th ult. (Paper and discussion are published elsewhere in this issue—Ed.). The President (Mr. E. Whitley Baker, of Wimbourne) presided, and the others who signed the attendance book were Miss Cust, Messrs. Hobday, Caudwell, Gould, Facer, Harding, Maynard, Pack, Parr, Ripley, Rockett and Tutt, together with Messrs. Cassell, Hunt, Marriott, Stuart Scott (visitors).

The minutes of the previous meeting, as published in the *Veterinary Record*, were taken as read and confirmed.

Apologies: Messrs. Male, Moffett, Samson, C. H. Sheather, A. L. Sheather, Martin and Wood.

Letters were also read from Mr. S. H. Slocock acknowledging the Society's congratulations on his election as President of the College, and from Mr. P. J. Simpson acknowledging the resolution of congratulation which the members had passed on his election to the Presidential Chair of the Central Society.

The HON. SECRETARY said he was sure they would all be sorry to hear that his predecessor in office, Mr. T. J. Angwin, of Arundel, had recently passed away,

and if it met with their approval he proposed writing a letter of sympathy and condolence with the widow.

The PRESIDENT remarked that he was sure they would all wish Mr. Facer to do this. The late Mr. Angwin not only carried on the duties of Honorary Secretary for several years, but he had also taken a keen interest in the Society in other ways by contributing papers from time to time, and both they as a Society and the Profession as a whole had sustained a distinct loss by his death. If any proposition was needed, he would move from the chair, that Mr. Facer write Mrs. Angwin and convey an expression of their sympathy with her in her loss. This was unanimously agreed, the members signifying their assent by rising silently from their seats.

Miss Cust and Mr. G. N. Gould were unanimously elected members of the Society.

It was decided to hold the next meeting, the annual one, in London, at the end of March.

The meeting next heard Mr. Scott's paper, which was greatly enjoyed and was followed by a good discussion.

A hearty vote of thanks was accorded both to Mr. Scott and to Dr. Seager Thomas.

Dr. THOMAS, in returning thanks for Mr. Scott, said he very much appreciated the kind welcome they had given him that afternoon.

The company afterwards partook of tea, at the invitation of Messrs. Rockett and Harding—an act of hospitality which was suitable acknowledged by the President.

J. FACER, *Hon. Secretary.*

Central Division.

PARASITIC IRRITATION AS A FACTOR IN CANCER CAUSATION.

(*Continued from page* 261).

Dr. L. W. SAMBON, continuing his observations on the above subject, said:

My field researches in England, Iceland and Italy, have proved in the clearest way possible that cancer everywhere exhibits the same strikingly unequal topographical distribution and that its location within the body of man varies considerably in different countries as it varies also in different zoological species.

With regard to topographical distribution, nothing could be more striking than its frequent limitation to certain districts, villages, streets or single houses. Again and again, I have found the disease strike, during periods of fifty or more years, one part only of a village or a single street. Two interesting examples—Villa Lagarina and S. Michele of Appiano, in the Trentino, Italy—I have published already with maps and all necessary documents, others I am publishing shortly. Such peculiarities of distribution cannot be explained by any of the prevailing theories. To my mind they spell parasitism and, in the case of cancer streets and cancer houses, they indicate the agency of local vermin.

Similar limitations to particular districts, streets or houses, long known in the epidemiology of yellow fever and looked upon as mysterious, are now easily and perfectly explained by the habits of the silver-striped mosquito—the *Aedes argenteus*—which is the carrier of the amaril germ.

Among the vermin invariably found in Italian cancer houses were mice, rats, cockroaches (*Blatta orientalis* and *Blattella germanica*), meal-beetles (*Tenebrio molitor* and *T. obscurus*), and cellar-beetles (*Blaps lethifera*, *B. mucronata*, *B. gages* and *B. gibba*).

Now, rats and mice are definitive hosts, and cockroaches, meal-beetles and cellar-beetles intermediary hosts of gongylonema. This nematode, Baylis and I found to be prevalent in the oxen, sheep, goats and hogs of the cancer districts visited, and human cancer within these same districts was, in the great majority of cases, located in the upper part of the alimentary tract and more especially in the æsophagus and the cardiac portion of the stomach, in other words, the very site chosen by the adult gongylonema. For these and other reasons, I thought that Gongylonema, already found in man in the United States of America and in Italty, might come under suspicion.

But let us see what we know with regard to gongylonema and other parasitic worms in association with cancer. Probably you already are familiar with the observations and researches made by Askanazy, Borrel, Fibiger and others. Askanazy pointed out in 1901 that primary cancer of the liver frequently followed infection by the European cat fluke (*Opisthorchis felineus*), a tiny flat worm which affects the liver and, in East Prussia, is frequent in man. Five years later Borrel showed that in rats and mice, cancer frequently follows invasion of the liver by the larval form of the cat's thick-necked tapeworm (*Reditaenia taeniaeformis*), the tiny bladder-worms often being embedded in the centre of the cancerous growths. Fibiger, in 1914, proved that carcinoma in the stomach of rats may be brought about by a slender roundworm which he proposed to call *Gongylonema neoplasticum* on account of its association with the neoplasm. Other worm infections, as those of the Egyptian bladder-fluke (*Schistosoma haematobium*) and the Chinese liver-fluke (*Clonorchis sinensis*) in man and that of Thelazia, a filaroid worm affecting the lachrimal ducts, in cattle are all associated with tumour formation, which follows invariably in those parts of the body in which the worm-parasites locate themselves. In all these the worm is only a predisposing factor and not the primary cause of cancer. It acts probably in the same way as lower organisms, such as the luetic, or even inanimate irritants.

The importance of these worm-agents, be they carriers and sowers of the specific organism, or merely acting as mechanical or chemical irritants, is that, through their intermediary hosts or porters, we have means of control, and this is all important when we consider the futility of all our present means of treatment, both medical and surgical.

Allow me to mention a striking example. Like cancer, tropical elephantiasis exhibits an irregular

topography and prevalence, closely following that of a worm parasite, the *Filaria bancrofti*. The filaria is not the actual cause of elephantiasis, which is found also in countries where the filaria is unknown, yet certainly the filaria is an important predisposing cause in tropical regions. The tumour in elephantiasis is due primarily to a micro-organism which causes repeated attacks of lymphangitis, blocks the lymphatic channels and thus builds up the unsightly elephantoid growths. By eradicating the mosquito we stamp out elephantiasis just as we do malaria, yellow fever, dengue and other diseases fostered and disseminated by mosquitoes.

To my mind, the evidence so far collected is certainly impressive. Take the rat, for instance. In this small mammal, so well known in the laboratory, several types of cancer of skin, mammary gland, stomach, liver and kidney have been shown to be closely associated with external or internal parasites. The best known are Borrel's hepatic sarcoma and Fibiger's gastric carcinoma, which I have already mentioned. The former is brought about by the agency of a cestode, the larval form of which develops encysted within the liver of rats, mice, moles and bats, the latter induced by a nematode which lives in sinuous galleries burrowed through the epithelial lining of the cardiac portion of the stomach, and the larvæ of which are fostered by cockroaches, meal-beetles, cellar-beetles and various dung-beetles. Both these forms of cancer may be found at the same time in the same individual animal, and both may be produced at will experimentally: the gastric carcinoma by feeding rats on cockroaches or meal-worms harbouring, in their musculature or body cavity, the larval forms of the gongylonema and the liver sarcoma by giving food containing the eggs of the cat tapeworm. It is thus that Bullock and Curtis, of the George Crocker Research Fund Laboratory, in New York, have been able to raise more than a thousand liver sarcomas in rats.

Look at these slides I am sending round. You need no microscope. Here is a section of a rat's kidney, the empty space in the middle represents the cyst of a larval cestode, the *Cysticercus fasciolaris*; in it you will notice fragments of the sliced worm and at the edge of the cyst-wall, on the left, a rounded dark body formed by cells smaller, more closely set than those of the organ in which it is enchased. This body, no larger than a pin's head, is a nascent cancer, budding, as it were, from the outer wall of the worm-cyst. Now look at this liver section, here the bladder-worm shows to perfection, the lambent sarcoma looks like a flame rising out of the upper end of the worm-cyst. What better evidence could one adduce? One needs but eyes to see.

It is Borrel, a great French cancer student, who, in 1906, first actually gave a tangible demonstration of this frequent and close association between bladder-worm and cancer, but already in 1904 at Belfast, and again in 1906 in London, basing myself on epidemiological and parasitological *data*, I had suggested that cancer might be brought about through the agency of parasitic worms, more especially Spiruroid worms, and that cockroaches, meal-beetles and other household insects—their necessary intermediary hosts—should be looked upon with suspicion, while mouse, rat, cat and dog should be regarded as possible cancer reservoirs. My suggestions were strengthened by Fibiger's brilliant work on the rat in 1914, and my own recent investigations seem likely to prove the reasonableness of my previsions.

Had I time, I should like to indicate possible associations between cancer and certain other parasitic worms such as *Trichinella spiralis* and *Oxyuris vermicularis*, but I have trespassed already far too long on your time.

One observation, however, I must perforce rehearse. It had been pointed out that primary cancer of the liver or gall-bladder was common among the fisher-folk of the Baltic shores and more especially among those living round the Kurische Haff, a vast lagoon in East Prussia, between Konigsberg and Memel. Dr. Rindfleisch's researches elicited the fact that the fishermen of this region were in the habit of eating raw fish during their fishing cruises, hence they were heavily infested by *Opisthorchis felineus*, a tiny trematode the cercariæ of which encyst in the musculature and skin of several species of cyprinoid fishes, such as the roach and the ide which inhabit both salt and fresh waters. What could better demonstrate the cancer-producing agency of the trematode than this epidemiological observation which has all the distinctiveness of a purposely-made laboratory experiment?

Primary cancer of the liver is very rare in Europe, but exceedingly common in certain coast districts of Asia. In the island of Kyushu, Japan, where the Chinese liver-fluke *Clonorchis sinensis* is particularly prevalent, primary cancer of the liver is three times more frequent than in the rest of Japan.

With regard to the actual parasite of cancer, I should like to point out that, apart from the precipitate, abnormal proliferation of the tissue-cells concerned, which is so characteristic a feature of cancer growth, there are peculiar inclusions in the cancer-cells which suggest the presence and activities of some parasite hitherto undetected on account of extreme minuteness or unsuitable technique. Already several diseases, such as foot-and-mouth disease, are attributed to ultramicroscopic organisms, and Rous, an American investigator, has shown that this is probably the case in cancer. He reproduces tumours of connective-tissue type in healthy fowls by inoculating them with the juices expressed from similar chicken tumours and passed through compact Berkfeld filters; a brilliant piece of work.

A striking analogy has been adduced by Erwin Smith in his work on crown-gall. This is a cancer-like growth of plants, in every way similar to animal cancer. The great American plant-pathologist has proved that it is caused by micro-organisms few and difficult to see in the affected plant-cells.

Possibly the cancer germ is a dominant semi-symbiotic organism which compels the cancer-cell itself to act as a parasite.

However this may be, at present, I am inclined to give more importance to the animate irritant, be it worm or protozoon, which seems in the majority of cases necessary for the development of the cancer germ, because most parasitic worms and protozoa are fostered in one or other stage of their life by controllable invertebrate animals. Take yellow fever: here, as in cancer, many parasites in turn have been described as causative, all to be discarded. The latest, Noguchi's Leptospira, probably is the real one. Yet, years ago, the discovery that a mosquito acted as intermediary host and sole disseminator of the unknown germ enabled us to stamp out yellow fever in its very strongholds. Who knows not the triumph of sanitation at Havana and all along the Panama Canal zone? (Applause.)

Colonel YOUNG: I should be very glad if Dr. Sambon would come some other night and give us a paper on this very interesting subject. (Hear, hear.)

The PRESIDENT: I can assure you that will not be forgotten, and I hope Dr. Sambon will oblige us. (Applause.)

Mr. C. H. SHEATHER then presented his paper on "Points for Consideration in the Selection of Horses for Work in Towns." A long and animated discussion followed, and both appear at the commencement of this issue of the "*Record*."

Before the close of the meeting, Dr. SAMBON thanked the Fellows for the invitation to meet them. He said:

I must thank you again for your very kind invitation and welcome. I have enjoyed your meeting exceedingly. Seldom have I listened to a discussion more interesting, more instructive, more witty and delightful than yours. It has been a perfect treat.

The parasites you have shown must have pleased my friend Dr. Baylis as much as myself. Never before had I seen specimens of the giant Balbiana.

My only regret is that I did not listen to Mr. Mr. Sheather's paper on the perfect horse a year ago, because, last summer, when I visited Iceland, I was asked to choose a pony. Happily the pony chose me. I had my pockets full of oatmeal biscuits and a jolly little Houyhnhnm, on Nesjavellir farm near the Henghill solfataras, faithfully as Tartarin's camel. I decided to buy it and rode straight away sixty-five miles on its back, reaching Reykjavik late at night. On arrival, a very affable person, who told me he was a relative or a friend of a friend of mine, very kindly offered to take charge of the pony and led it to a safe enclosure belonging to the chief veterinary surgeon. I am perfectly certain now that my pony had wonderful points. Indeed, next morning, I was informed that it had broken loose during the bright daylight night and had disappeared. Every effort was made by friends and police to recover it, and, sure enough, like Mark Twain's white elephant, it was seen in the most diverse parts of Iceland, but like that long-nosed ungulate, invariably it escaped capture. The last I heard of my Pegasus was that a pony answering to my description of it, alas! a description lacking all the fine terms

(*Continued at foot of next column.*)

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest in these columns.

Diary of Events.

April 21st—Meeting of the Derbyshire Division at Derby.
May 7th—Last day for Nominations for election to Council R.C.V.S.
„ 21st—R.C.V.S. Voting Papers and Annual Report issued.
„ 28th—R.C.V.S. Voting Papers to be returned.
June 4th—R.C.V.S. Annual General Meeting. Earl Haig to attend to receive Diploma of Honorary Associate.

We have again to request members not to "leave it to the other fellow" to keep us supplied with notes of interesting cases, which it will give us great pleasure to write up in a form suitable for publication in our Clinical and Case Report Section. Our last reminder met with a gratifying response and we hope the present will have an even more satisfactory result.

FOOT-AND-MOUTH DISEASE: OUTBREAK AT SHEFFIELD.

An outbreak of foot-and-mouth disease was confirmed at the end of last week on premises at Sheffield. The total stock on the farm consists of one bull, 14 cows, and 14 pigs, of which seven cows were found affected with the disease. One of the affected cows was moved on to the farm from premises at Oughty Bridge on March 14, and it is thought the disease may possibly have been introduced by this animal; but further enquiries are being made with a view to discovering definitely the source of infection.

The slaughter of the stock has been authorised, and the Ministry of Agriculture has made an Order imposing restrictions on the movement of animals within a radius of about 15 miles from the infected place.

B.V.Sc. DEGREE.

The undermentioned graduates of the Royal (Dick) Veterinary College, Edinburgh, have graduated B.Sc (Veterinary Science) at the University of Edinburgh:—Alexander Brownlee, Mid. Calder, Midlothian, Norman Dobson, Bradford.

(*Continued from previous column.*)

I have just learnt—had been seen somewhere in Greenland, and my informant drily suggested that probably the American aviators, either Smith or Nelson, had wafted it over.

Gentlemen, I have enjoyed myself well and trust you will keep your promise and ask me again to your cheery meetings. (Applause.)

Votes of thanks to the essayist of the evening, to Drs. Baylis and Sambon, and to the President for his conduct in the chair, terminated a memorable evening.

J. F. MACDONALD, *Hon. Secretary.*

Meat and Milk Inspection in Ireland.

"The council of the Veterinary Medical Association (Irish Free State) had under consideration at a recent meeting the report of the discussion in the Senate on the amendment to the public health section of the local government bill specifically providing for the veterinary inspection of dairy cows and of meat. From the discussion it might, it was thought, be inferred that veterinary surgeons were only employed under the Public Health Acts for the purpose of inspecting milk and meat as they were presented for human consumption, no mention having been made of their indispensable services in inspecting the sources of these food supplies—the dairy cows and the carcasses of beasts in the slaughterhouse. The veterinary profession, it was said, wished to make its position clear, and to inform the public of the danger of diseases being communicated from animals to man through the consumption of milk and meat from diseased animals; 80 per cent. of the cases of abdominal and glandular tuberculosis in children were contracted by drinking milk from tuberculous cows. Septic sore throat in the human subject had been attributed to drinking milk from cows with diseased udders. Many fatal cases of meat poisoning had ensued from the consumption of meat from carcasses that had been affected with disease or had been improperly handled. It was, therefore, of vital importance to the health of the community that qualified veterinary surgeons should be made responsible for the inspection of dairy cows and of milk, of carcasses of animals slaughtered for human consumption, and of meat stores. To ensure this it was obviously a wise step on the part of the Minister for Public Health to have had an amendment inserted in the public health section of the bill specifically providing for veterinary inspection under the Public Health Acts, otherwise it would not be compulsory by law to have this inspection conducted by qualified men. Apart from the public health point of view, inspection was essential in connection with the export trade in meat in order to ensure the standard of the meat exported. In the United States, Canada, Australia, New Zealand, and the Argentine all the meat exported had to be inspected by veterinary surgeons. In all the large cities of Great Britain veterinary surgeons were now appointed for the inspection of dairy cows, milk, and meat."—*British Medical Journal.*

CORRESPONDENCE.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Alleged Lead Poisoning in Cattle.

To the Editor of the Veterinary Record.

Sir,—The letter of Professor Lander, under the above title invites consideration of "the problem of the degree of solution of lead when comparatively small quantities of lead arsenate are intimately churned in comparatively large quantities of digestive juices."

As most of the lead ores, and most of the compounds of lead used in the arts are insoluble, I presume that Professor Lander would extend the necessity of applying the same enquiry to all such insoluble salts of the metal.

Almost all the cases of lead poisoning occurring in my district, as in all other lead mining centres, where the ore occurs as galena, are due to the ingestion of this mineral, and I think I am correct in saying that this sulphide of lead is not only entirely insoluble but also is the most stable of all lead compounds.

This being so, I think the following details of some cases of lead poisoning (typical of others) are relevant to the problem Professor Lander sets us, as showing the rapidity with which acute poisoning follows the ingestion of the mineral, the reduction of which to soluble salts capable of absorption must be presumed to be largely due to the action of the digestive juices.

Following the subsidence of heavy floods, seven cows were turned on to pasture which had been submerged, on March 16th, 1890, and were out for several hours daily. On the morning of the 18th, I was called to attend a cow said to be choking, but I diagnosed acute lead poisoning, and two others were also exhibiting typical symptoms. Early on the 19th, I was called to another farm adjoining, and found four cows showing acute symptoms.

Of the total of seven animals affected, five were dead by the morning of the 21st, but the other two recovered after a long illness showing marked digestive and nervous derangement.

The *post-mortems* showed acute gastro-enteritis, and in all of them visible glistening particles of galena were found in the rumen. Analysis of portions of the liver, spleen, kidneys and heart showed the presence of lead.

Such cases as these, I think, prove that the stable mineral galena is capable of being rapidly reduced in the animal economy to soluble salts.

It has to be borne in mind, however (and I think there is room for research here), that in the mining dumps which are washed down by floods on to pastures, the lead may occur in the form of carbonates, oxides, and chlorides, owing to reduction of the galena by exposure to air and moisture in the presence of decaying vegetable material. It would be interesting and valuable to know to what extent such reduction of the galena occurs, exactly what compounds are formed, and in what proportion they are present in these dumps, for I can hardly believe that such rapid poisoning could result if galena alone were present. I suspect that the older the dumps are, the more deadly they become, owing to a greater reduction of the sulphide to salts more easily acted upon by the digestive juices, but only a series of qualitative, and quantitative analyses of such dump refuse could give us actual *data*.

Clinically, the broad fact emerges from such cases as these cited, that acute lead poisoning may follow the grazing of animals upon pastures so contaminated within forty-eight hours of the animals being so pastured.—Yours faithfully, Edward P. Edwards.

Mold.

To the Editor of The Veterinary Record.

Sir,—Professor Clough has done the veterinary profession a service by giving publicity to the case of Brown *v.* Calvert, and it must be a satisfaction to him to find his views confirmed so convincingly as they have been in your columns during the past few weeks. I would suggest that Professor Dixon's attention should be drawn to the correspondence, and the hospitality of your pages offered him for his reply.—I am, Yours faithfully, Donald Campbell.

[The course suggested by our correspondent has already been adopted.—Ed.]

The Editor acknowledges the receipt of the following:—

Communications from Messrs. J. Blakeway, T. M. Inglis and V. V. V. Tyer.

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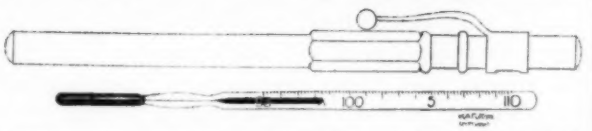

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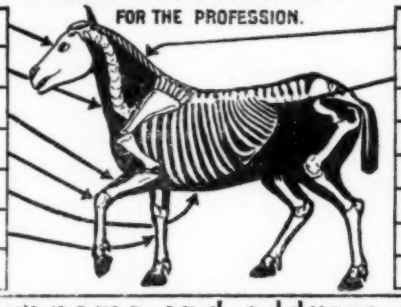

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